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1984

INSTITUTE OF NUCLEAR RESEARCH
OF THE HUNGARIAN ACADEMY OF SCIENCES
DEBRECEN, HUNGARY

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ANNUAL REPORT
1984

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Edited by R. G. Lovas

PREFACE

The purpose of this Annual Report is to survey the scientific activity of the Institute of Nuclear Research of the Hungarian Academy of Sciences in 1984. We intend to achieve this object mainly by presenting a list of all scientific papers submitted or published and talks delivered by members of this Institute in the course of 1984. Chapter "Development of Methods and Instruments" also contains status reports on the cyclotron project and on the Van de Graaff generator. Since the period between the submission and appearance of a paper may span more than one calendar year, there is an overlap with the previous and, presumably, with the next Annual Reports as well. Some publications are given account of by including their bibliographical data, some are reported on by abstracts as well. Abstracts of a publication are, however, included only in one Annual Report, usually in that which reports on the submission of the manuscript.

The material is arranged, somewhat arbitrarily, under five headings representing the main fields of the research activity of the Institute. These chapters are followed by a list of the formal weekly seminars held at the Institute in 1984. To guide the reader, an author index is also included.

Thanks are due to Mrs. A. Darin for collecting the material for this Report. The collection work was closed on 18th January, 1985.

R. G. Lovas

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Akadémiai Kiadó, Budapest, 1984

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E. Koltay (editor)

Akadémiai Kiadó, Budapest, 1984

(In Hungarian)

RESONANT OR BOUND STATE SOLUTION OF THE SCHRÖDINGER EQUATION IN DEFORMED OR SPHERICAL POTENTIAL

A.T. Kruppa and Z. Papp

Submitted to Comput. Phys. Commun.

Purely outgoing solution of the one-particle Schrödinger equation is searched in special cases. The program PSEUDO (Potential Separable Expansion for Unbound Deformed Orbits) either calculates single particle resonant or bound state energies and wave functions in an axially or spherically symmetric potential or gives the well-depths of the potential belonging to a prescribed energy value (sturmian problem).

A separable expansion of the original local potential is carried out on the harmonic oscillator basis. The zeros of the Fredholm determinant of the finite rank homogeneous Lippmann-Schwinger equation corresponding to the approximate potential are searched. The number of terms in the potential expansion is increased until the convergence is reached.

SINGLE-PARTICLE RESONANT STATES IN DEFORMED POTENTIALS

B. Gyarmati, A.T. Kruppa, Z. Papp and G. Wolf

Nucl. Phys. A417 (1984) 393-404

RESONANT STATE IN MOMENTUM REPRESENTATION

B. Gyarmati, A.T. Kruppa and Z. Papp

Submitted to Phys. Rev. C

It is shown that the method of Hernández and Mondragón for generating the Gamow states of a local or nonlocal potential in momentum representation is equivalent to a method based on an expansion of the potential in separable kernels and Berggren's rules of handling Gamow states. The advantage of this way of producing Gamow states over the direct numerical integration of the Schrödinger equation in co-ordinate representation is pointed out and the feasibility in practical problems is demonstrated.

ORTHOGONALITY-CONDITION MODEL FOR BOUND STATES WITH A SEPARABLE EXPANSION OF THE POTENTIAL

K.F. Pál

Submitted to J. Phys. A

We show a very efficient solution of the equation of Saito's orthogonality-condition model (OCM) for bound states by means of a separable expansion of the potential (PSE method). We derive some simplifications of the published formulae of the PSE method, which facilitate its application to the OCM and may be useful in solving the Schrödinger equation as well.

SOLUTION OF THE COUPLED-CHANNELS SCATTERING PROBLEM ON A SQUARE-INTEGRABLE BASIS

T. Vass

Diploma thesis (supervisor: R.G. Lovas), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen

(In Hungarian)

COMMENT ON "ENERGY DEPENDENCE VERSUS ANGULAR MOMENTUM DEPENDENCE OF OPTICAL POTENTIALS"

R.G. Lovas and K.F. Pál

Phys. Rev. C30 (1984) 410-411

TRANSFER REACTION SPECTROSCOPY REVISITED

K.F. Pál and R.G. Lovas

Talk, Proc.Int.Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 2, pp. 507-514

Two conflicting views on the nuclear wave-function overlaps and spectroscopic factors involved in the DWBA model for transfer reactions are reviewed. We show that the two approaches result in appreciably different spectroscopic factors and cross sections. By comparing their derivations, we argue that only the conventional approach, in which the overlaps cannot be interpreted as single-particle wave functions, is well founded. We propose a theoretically sound yet practicable treatment of these overlaps.

THE INTERPRETATION AND APPLICATION OF CLUSTER SPECTROSCOPIC FACTORS

R.G. Lovas

Seminar talk, Department of Physics, University of Siegen, 5 November, 1984

CONVENTIONAL VERSUS NON-CONVENTIONAL MODELS OF CLUSTER REARRANGEMENT PROCESSES

R.G. Lovas

Seminar talk, Department of Theoretical Physics, Technical University of Munich, 13 November, 1984

A VIEW ON CLUSTER REACTION SPECTROSCOPY

R.G. Lovas

Seminar talk, Institute of Theoretical Physics I, University of Münster, 19 November, 1984

ON FLIESSBACH'S APPROACHES TO DIRECT REACTIONS

R.G. Lovas

Submitted to Z. Physik A

The conventional models of direct cluster reactions treat the nuclear wave-function overlaps or reduced-width amplitudes as single-particle wave functions, which is contrary to the Pauli principle. The motivation of Fliessbach's two approaches reviewed in this paper is to improve on these models by a proper treatment of antisymmetrization. Fliessbach's approaches involve redefined reduced-width amplitudes, which can be regarded as single-particle wave functions. We show, however, that in the approach specialized to transfer reactions the antisymmetrization is in fact treated incorrectly, and the more general approach seems applicable only to processes that involve just two nuclear fragments, like α decay or radiative capture. We outline how single-particle wave functions can be used correctly in approximating reduced-width amplitudes. We show that our approach helps to bring the phenomenological spectroscopic factors into agreement with the nuclear structure models.

REPLY TO FLIESSBACH

R.G. Lovas

Submitted to Z. Physik A

STUDY OF ELECTRON-POSITRON INTERNAL PAIR FORMATION

T. Fényes

Talk, Symp. in honour of A. Szalay on Nuclear Research and Its Application in Debrecen; Debrecen, 27 September, 1984.
Submitted to Fiz. Szemle

(In Hungarian)

EXPLANATION OF $(ft)^+/(ft)^-$ ANOMALIES IN THE BETA DECAY OF MIRROR NUCLEI BY ATOMIC OVERLAP

E. Vatai

Submitted to Phys. Lett. B

EXPLANATION OF $(ft)^+/(ft)^-$ ANOMALIES IN THE BETA DECAY OF MIRROR NUCLEI BY ATOMIC OVERLAP

E. Vatai and E. Szabó

Poster, Abstracts of Int. Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, pp. 482-483

ENERGY DEPENDENCE OF THE CROSS-SECTIONS OF THE PROCESSES $^{116,120}Sn(p,p)^{116,120}Sn$ NEAR THE COULOMB BARRIER AND THE JLM OPTICAL POTENTIAL

T. Vertse and L. Zolnai

Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 328

(In Russian)

BEHAVIOUR OF THE REAL PART OF THE NUCLEON OPTICAL POTENTIAL FOR MEDIUM-WEIGHT NUCLEI

W. Haider*, A.M. Kobos*, J.R. Rook* and K.F. Pál

*Nuclear Physics Laboratory, Oxford

Nucl. Phys. A419(1984)521-529

A recent paper has shown that empirical values of J, the volume integral per nucleon of the real part of the nucleon optical potential, for intermediate-mass nuclei do not follow the predictions of the Lane model. We calculate the optical potentials using first-order Brueckner theory, obtain the corresponding values of J, and compare these with the empirical values. Agreement with some of the empirical features is obtained but major qualitative discrepancies remain. We trace these discrepancies to the method used to extract values of J from the experimental scattering cross sections.

EFFECTS OF THE PAULI PRINCIPLE IN QUASIELASTIC CLUSTER KNOCK-OUT REACTIONS

R. Beck*, F. Dickmann* and R.G. Lovas

*Kernforschungszentrum Karlsruhe

Talk, Annual Meeting of the German Physical Society, Innsbruck, 26-30 March, 1984

EFFECTS OF THE PAULI PRINCIPLE IN QUASIELASTIC CLUSTER KNOCK-OUT REACTIONS

R. Beck*, F. Dickmann* and R.G. Lovas

*Kernforschungszentrum Karlsruhe

Contributions to 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984, ed. J. S. Lilley and M. A. Nagarajan (Daresbury Laboratory, Daresbury, 1984) pp. 175-176

QUASIELASTIC CLUSTER KNOCK-OUT REACTIONS AND THE MICROSCOPIC CLUSTER MODEL

R. Beck*, F. Dickmann* and R.G. Lovas

*Kernforschungszentrum Karlsruhe

Submitted to Nucl. Phys. A

The spectroscopic information contained in quasielastic cluster knock-out reactions is examined with a microscopic approach to the impulse approximation. It is shown that, because of the Pauli principle, the extracted spectroscopic factor is distinct from the probability (or amount) of clustering. A formalism is elaborated for the calculation of these quantities in a generator-coordinate model for a superposition of different clusterizations. This formalism is used to study the α+d clustering properties of ^{6}Li described as a superposition of the α+d and ^{5}He+p systems. The model predicts the spectroscopic factor (amount of clustering) to be 1.04(0.97) and 1.01(0.94) for the ground and first excited state, respectively. The calculated spectroscopic amplitude, as a function of the αd relative momentum, is in good agreement with those extracted from high-energy ^{6}Li(p,pd)α and ^{6}Li(α,2α)d experiments.

MICROSCOPIC FORM FACTORS FOR CLUSTER TRANSFER REACTIONS

R.G. Lovas

Invited talk, 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984. Submitted to the Proceedings, ed. J.S. Lilley and M.A. Nagarajan (to appear at Reidel, Dordrecht)

The nuclear-structure aspects of the distorted-wave Born approximation (DWBA) model of direct cluster transfer reactions are reviewed.

We briefly survey the assumptions inherent in the practicable version of the DWBA. In this model the structure of the nuclei participating in the reaction A(a,b)B (a=b+x, B=A+x) is contained in the form factor

$$F(\vec{r}_{bx},\vec{r}_{Ax}) = \binom{a}{x}^{\frac{1}{2}}\binom{B}{x}^{\frac{1}{2}}\langle\Phi_B\Phi_b|\sum_{i\in b}\sum_{j\in x}V_{ij}|\Phi_A\Phi_a\rangle, \qquad (1)$$

where V_{ij} is the N-N force and Φ are internal wave functions. In a cluster-transfer approximation F factorizes into an overlap and a potential overlap: $F(\vec{r}_{bx},\vec{r}_{Ax}) = U_B^*(\vec{r}_{Ax})\,W_a(\vec{r}_{bx})$, with

$$U_B(\vec{r}_{Ax}) = \binom{B}{x}^{\frac{1}{2}}\langle\Phi_A\Phi_x|\Phi_B\rangle, \qquad (2)$$

$$W_a(\vec{r}_{bx}) = \binom{a}{x}^{\frac{1}{2}}\langle\Phi_b\Phi_x|\sum_i\sum_j V_{ij}|\Phi_a\rangle. \qquad (3)$$

To be able to probe the structure of B with the reaction A(a,b)B, one must know W_a well. We review several methods for the calculation of W_a from realistic models of the nucleus a. The sturcture models considered are the generator-coordinate and the orthogonality-condition model.

We present results for a=^{6}Li=α+t and a=^{6}Li=α+d. We compare the theoretical potential overlaps with phenomenological ones and show examples for the ^{12}C(^{7}Li,t)^{16}O and ^{16}O(^{6}Li,d)^{20}Ne DWBA cross sections obtained. We also present actual analyses of some (^{7}Li,t) reactions using the theoretical potential overlaps. We find that the spectroscopic factors extracted in this way differ from those obtained with conventional methods and tend to be more realistic.

For a few states of the B=^{20}Ne=^{16}O+α system we also present the overlap U_B and compare it with phenomenological functions. We also illustrate the differences by showing DWBA cross sections.

The use of local nucleus-nucleus potentials for the bx and Ax interactions is discussed in some detail. Finally, constructive proposals are given for exploiting the presented results and conclusions in future phenomenological analyses.

NUCLEAR STRUCTURE ASPECTS OF CLUSTER TRANSFER REACTIONS

K.F. Pál

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

CLUSTER TRANSFER FORM FACTOR AND INTERCLUSTER RELATIVE MOTION IN THE ORTHOGONALITY-CONDITION MODEL

R. G. Lovas and K. F. Pál

Nucl. Phys. A424 (1984) 143-156

The orthogonality-condition model (OCM) of nucleon clusterization in nuclear systems [1] represents the intercluster relative motion by a local-potential problem in the subspace allowed by the Pauli principle for the underlying nucleon degrees of freedom. This model is well-known to be a good approximation to the microscopic cluster models both in predicting bound-state energies and scattering phase shifts. In this work we have examined the performance of the OCM in reproducing some quantities that characterize the details of the intercluster relative motion. The quantities chosen are the overlap and potential overlap functions, which appear in the distorted-wave Born approximation treatment of cluster transfer reactions [2]. We tested the OCM by comparing the overlaps and potential overlaps produced by various local potentials in the OCM and by various nucleon-nucleon (N-N) forces in the corresponding microscopic model [2] for the ground state of ^{7}Li regarded as an α+t cluster composition. All potentials were slightly adjusted to reproduce the measured αt separation energy. Thus the differences tested are those that arise in the interaction region.

It was found that the OCM overlap and potential overlap depend strongly on the choice of the local OCM potential. To establish a correspondence between the N-N and OCM potentials, we used Friedrich's recipe [3] for the choice of the latter. This consists in an optimization of the parameters of the OCM potential so that the OCM may reproduce the expectation value of the microscopic Hamiltonian in a two-centre shell-model state for a range of the distance between the centres. The corresponding microscopic and OCM overlaps and potential overlaps were found to agree excellently. Hence the differences between the various OCM results have been traced back to the underlying N-N forces. The N-N interactions considered reproduce the αt scattering phase shift as well as the ground-state properties of ^{7}Li, and we have no other criterion for singling out any of them. The present results thus indicate that our knowledge of the effective N-N force may not as yet be sufficient to determine the overlap and potential overlap with the desired reliability.

[1] S. Saito, Prog. Theor. Phys. Suppl. No.62 (1977) 11
[2] K.F. Pál, R.G. Lovas, M.A. Nagarajan, B. Gyarmati and T. Vertse, Nucl. Phys. A402 (1983) 114
[3] H. Friedrich, Phys. Reports 74 (1981) 209

MEASUREMENT OF THE $^{12}C(^{12}C,^{8}Be_{g.s.})^{16}O_{g.s.}$ CROSS SECTION AT SUBBARRIER ENERGIES BY PLASTIC DETECTORS

I. Hunyadi, I.M. Szöghy* and B. Čujec*

*Université Laval, Québec

Proc.Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S.A. Durrani et al., Nucl. Tracks 8 (1984) 525-528

STUDY OF LOW-ENERGY NUCLEAR REACTIONS WITH TRACK METHOD

I. Hunyadi

Seminar talk, Université de Clermont-II, Laboratoire de Physique Corpusculaire, May 30, 1984

MEASUREMENT OF THE $^{12}C(^{12}C,^{8}Be)^{16}O$ CROSS SECTION AT SUBCOULOMB ENERGIES BY PLASTIC TRACK DETECTORS

I. Hunyadi

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

CHARGED PARTICLE SPECTROSCOPY WITH SOLID STATE NUCLEAR TRACK DETECTORS AND THE STUDY OF $^{12}C(^{12}C,^{8}Be)^{16}O$ REACTION AT SUBBARRIER ENERGIES BY SSNTD

I. Hunyadi

Seminar talk, Department of Nuclear Physics, Jožef Stefan Institute, University of Ljubljana, 6 September, 1984

CLUSTER MODEL WITH BREATHING CLUSTERS: DYNAMICAL DISTORTION EFFECTS IN ^{6}Li

R. Beck*, F. Dickmann* and A.T. Kruppa

*Kernforschungszentrum Karlsruhe

Phys. Rev. C 30 (1984) 1044-1054

Distortion effects in an assembly of clusters are studied by using a trial wave function in which—in addition to the intercluster separations—the size parameters of individual clusters appear as generator coordinates. An application to the nucleus ^{6}Li, which is described as a bound alpha + deuteron system, shows that these new degrees of freedom, which can lead to compressional vibrations, are indeed important. We find that the deuteron cluster is compressed, whereas the size and the compressibility of the alpha cluster are unchanged with respect to the free case.

THE CLUSTER MODEL WITH BREATHING CLUSTERS

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Contributions to 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984, ed. J.S. Lilley and M.A. Nagarajan (Daresbury Laboratory, Daresbury, 1984) pp. 79-80

STUDY OF ^{6}Li WITH THE GENERATOR-COORDINATE METHOD

A.T. Kruppa

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

RESONANT REACTIONS OF LIGHT NUCLEI AND THE NUCLEAR MOLECULES

J. Cseh

Submitted to Magy. Fiz. Folyóirat

(In Hungarian)

^{12}C+^{12}C RESONANCES WITHIN THE NUCLEAR VIBRON MODEL

J. Cseh

Submitted to the Physical Review C

The barrier region resonances of the ^{12}C+^{12}C system have been analysed by Erb and Bromley [1] in terms of the O(4) dynamical symmetry i.e. one of the two simple limiting cases of the nuclear vibron model [2]. We have reanalysed these data first in terms of both dynamical symmetries, as it was done with other systems in Ref. [3], then by using the general form of the Hamiltonian.

To characterize the situation we have defined a measure from the dynamical symmetries called m as follows:

$$H=\alpha C_{2O4}+\beta C_{203}+\gamma C_{1U3}+\delta C_{2U3}+\varepsilon,$$

$$m=\frac{\alpha^2}{\alpha^2+\gamma^2+\delta^2}.$$

Here C_{2O4} is the quadratic Casimir operator of the O(4) group, C_{1U3} is the linear Casimir operator of the U(3) group etc. Obviously, m=0 means that the U(3), while m=1 means that the O(4) symmetry is valid.

The parameters of the energy matrix have been searched by a least square fitting procedure, and several local minima have been found. Though the O(4) dynamical symmetry gave a better fit than the U(3), yet the best agreement (Fig.1) was given by a parameter set that gives m=0.003, i.e. a situation quite close to the U(3) limit on the one dymensional phase diagram.

[1] K.A. Erb and D.A. Bromley, Phys.Rev. C23 (1981) 2781
[2] F. Iachello, R.D. Levine, J. Chem.Phys. 77 (1982) 3046

[3] J. Cseh, Phys. Rev. C27 (1983) 2991

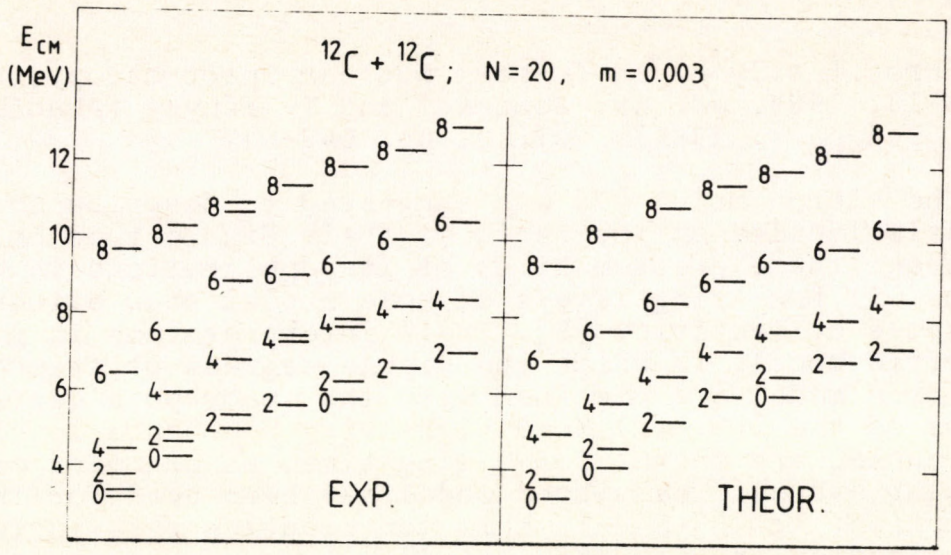

Fig.1. Energies of experimental and model states

APPLICATION OF THE ALGEBRAIC MODEL TO QUASIMOLECULAR RESONANCES

J. Cseh

Poster, Contributions to 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984, ed. J.S. Lilley and M.A. Nagarajan (Daresbury Laboratory, Daresbury, 1984) pp. 73-74

CLUSTER STUDIES BASED ON LOW-ENERGY ^{4}He BEAM

J. Cseh, Á.Z. Kiss, E. Koltay, Z. Máté, B. Nyakó, É. Pintye*, E. Somorjai and L. Zolnai

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Contributions to 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984, ed. J.S. Lilley and M.A. Nagarajan (Daresbury Laboratory, Daresbury, 1984) pp. 75-76

QUASIMOLECULAR AND CLUSTER STATES OF LIGHT NUCLEI AS EXAMPLES OF INTERMEDIATE STRUCTURE

J. Cseh

Contributions to 4th Int.Conf. on Clustering Aspects of Nuclear Structure and Nuclear Reactions, Chester, 23-27 July, 1984, ed. J.S. Lilley and M.A. Nagarajan (Daresbury Laboratory, Daresbury, 1984) pp. 77-78

LIGHT ION RESONANCES AND THE VIBRON MODEL

J. Cseh

Talk, Proc.Int.Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 2, pp. 643-647

The vibron model [1] was suggested to describe the nuclear quasimolecules on the basis of their dipole type collectivity. At present there are two kinds of its applications in nuclear physics. i) Low-lying levels of some nuclei show evidence of the dipole collectivity [2]. Their interpretation is given by the hybrid model, in which the dipole degrees of freedom of the vibron model are combined with the quadrupole degrees of freedom of the IBM. ii) Some high-lying resonance levels of light nuclei are known, for a long time, as examples of quasimolecular states. The vibron model has been used for their description, too [3-5]. In this contribution this latter kind of application is discussed briefly.

In the vibron model the collective excitations of a nuclear molecule are generated by a fixed number of bosons which are in two-body interaction with each other. The Hamiltonian has U(4) group structure, and the model has two dynamical symmetries labeled by O(4) and U(3).

The O(4) limit has been applied in Ref. [3] for the description of the $^{12}C+^{12}C$ system, and in Ref. [4] to the case of some core+α-particle states. These latter ones are compared with the spectra of both dynamical symmetries in Ref. [5]. Obviously, however, analyses based on the general case of the model are also needed in order to explore its applicability. Using the ROTVIB code [6] in a parameter searching mode, we performed calculations on the data of Ref. [3], and on some core+α-particle states, recently.

The analyses, performed till now, are far from being complete. Only energies have been calculated, and no partial widths, for instance. Yet the vibron model seems to be a useful tool of the analysis. It may be applied more generally than most of the previous models of the quasimolecular states; and in this way a great number of states can be simply parametrized.

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[2] F. Iachello, A.D. Jackson, Phys.Lett. 108B (1982) 151
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M. Gai et al., Phys.Rev.Lett. 50 (1983) 239
M. Gai et al., Phys.Rev.Lett. 51 (1983) 646
W. Bonin et al., Z.Phys. A310 (1983) 249
[3] K.A. Erb, D.A. Bromley, Phys.Rev. C23 (1981) 2781
[4] J. Cseh, Izv.Akad. Nauk SSSR, Ser.Fiz. 47 (1983) 80
(Bull.Acad.Sci. SSSR, Ser.Fiz. 47 (1983) 78)
[5] J. Cseh, Phys.Rev. C27 (1983) 2991
[6] O.S. van Roosmalen, Comp. Program ROTVIB, Univ. Groningen, 1981

ANALYSIS OF FRAGMENTED GQR IN THE ^{24}Mg NUCLEUS

J. Cseh and I. Fodor*

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J. Phys. G 11 (1985) 103-112

RESONANCES OF THE ^{19}F+ALPHA SYSTEM

L. Zolnai

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

SEARCH FOR ANOMALOUS INTERNAL CONVERSION COEFFICIENT OF ^{18}F IN ^{16}O(^{3}He,p)^{18}F REACTION

A. Krasznahorkay, A. Földes, T. Kibédi and Zs. Dombrádi

Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 81

SEARCH FOR THE ANOMALOUS INTERNAL CONVERSION COEFFICIENT OF ^{18}F

A. Földes

Diploma thesis (supervisor: A. Krasznahorkay), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen.

The aim of the work was the investigation of the Internal Conversion Coefficients (ICC) of a few ^{18}F transitions and search for the theoretically predicted [1] anomalous ICC of the 1041 keV transition. The measurements were performed on the ^{3}He beams of the Debrecen 5 MV Van de Graaff accelerator, using the ^{16}O(^{3}He,p)^{18}F nuclear reaction. A miniorange spectrometer, built in the Nuclear Spectroscopy Department [2], was used for the electron measurements. For the measurements of the gamma-ray spectrum a Ge(Li) detector was used.

The deduced ICC of the 937 keV ^{18}F transition $(10\pm2)\cdot10^{-6}$ was obtained to be equal to the theoretical one within the error bars. The measuring time necessary to verify the anomaly of ICC of the 1041 keV transition has been estimated.

[1] A. Krasznahorkay, A. Földes, T. Kibédi and Zs. Dombrádi, ATOMKI Közl. 26 (1984) 81
[2] J. Gulyás, A. Domonyi, T. Kibédi, A. Krasznahorkay, T. Fényes and Zs. Schram, Prib. Tekh. Eksp. 4 (1984) 53

(In Hungarian)

SEARCH FOR ANOMALOUS INTERNAL CONVERSION COEFFICIENT OF ^{18}F

A. Krasznahorkay

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

LEVELS OF ^{14}N IN THE REACTION $^{10}B(alpha,p)^{13}C$ FROM THE ANALYSIS OF DOPPLER BROADENED GAMMA LINES

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*Clinic of Radiology, Medical University, Debrecen

Ph.D. thesis (supervisor: A.Z. Kiss), ATOMKI, Debrecen, 1983. Submitted to Kossuth University, Debrecen

(In Hungarian)

INVESTIGATION OF EXCITED STATES OF ^{29}P IN THE $^{28}Si(p,p)^{28}Si$ REACTION

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Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 309

(In Russian)

LINE-SHAPE ANALYSIS OF DOPPLER-BROADENED GAMMA-LINES FOR DERIVING THE ANGULAR DISTRIBUTION OF THE LIGHT REACTION PRODUCT

J. Cseh, Á.Z. Kiss, E. Koltay, B. Nyakó and É. Pintye*

*Clinic of Radiology, Medical University, Debrecen

Abstracts of Int.Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 77

INVESTIGATION OF RESONANCE STATES IN ELASTIC SCATTERING AND RADIATIVE CAPTURE PROCESSES

J. Cseh, E. Koltay, Z. Máté, E. Somorjai and L. Zolnai

Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 64

LEVELS OF ^{23}Na EXCITED BY THE $^{19}F(\alpha,\alpha)^{19}F$, $^{19}F(\alpha,\gamma)^{23}Na$ AND $^{19}F(\alpha,p)^{22}Ne$ REACTIONS

J. Cseh, E. Koltay, Z. Máté, E. Somorjai and L. Zolnai

Nucl. Phys. A413 (1984) 311-322

VIRTUAL EXCITATION OF THE GDR MODE IN THE SUBBARRIER $^{23}Na(p,\gamma)^{24}Mg$ REACTION

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Z. Physik A 318 (1984) 329-331

CALCULATIONS AND MEASUREMENTS ON THE STOPPING OF RECOIL ATOMIC NUCLEI RELATED TO THE APPLICATION OF THE DOPPLER EFFECT IN NUCLEAR SPECTROSCOPY

M.M. Abdel Hady

Thesis for the Candidate's Degree (supervisor: E. Koltay), ATOMKI, Debrecen, 1983. Submitted to the Hungarian Academy of Sciences

SHORT LIFETIMES IN ^{38}Ar

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Nucl. Phys. A426 (1984) 287-300

Mean lifetimes of levels in ^{38}Ar have been measured using the Doppler-shift-attenuation (DSA) method and the reaction $^{37}Cl(p,\gamma)^{38}Ar$. The lifetime values or limits were determined for 37 bound levels below the excitation energy of 9 MeV; the lifetimes of 9 levels, upper limits of 2 and lower limits of 3 levels are reported for the first time. For the effective stopping of recoils, the targets were prepared by implanting ^{37}Cl into Ta backings. The Monte Carlo method and the experimental stopping power were used in the DSA analysis.

MEASUREMENT OF SHORT LIFETIMES IN sd SHELL NUCLEI: SHORT LIFETIMES IN ^{38}Ar

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Proc.Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 1, pp. 93-97

EXCITED STATES OF THE ^{70}Ga NUCLEUS

T. Fényes, J. Gulyás, T. Kibédi, A. Krasznahorkay, J. Timár, S. Brant* and V. Paar*

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Nucl. Phys. A419 (1984) 557-570

PROTON-NEUTRON MULTIPLET STATES IN MEDIUM HEAVY ODD-ODD TRANSITIONAL NUCLEI

T. Fényes

Talk, Proc.Int.Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 1, pp. 67-80

The structures of ^{114}In, ^{102}Rh, ^{100}Tc, ^{98}Tc, ^{96}Nb, ^{94}Nb, ^{82}Br, ^{76}As, and ^{70}Ga odd-odd nuclei have been investigated with in-beam spectroscopic methods. The nuclei were produced from enriched isotopes through the (p,nγ) reaction. Using different spectrometers and semiconductor detectors, data were obtained on the energies and intensities of hard and soft γ-rays, conversion electrons, on the γ-threshold energies, γ-branching ratios, γ-ray angular anisotropy, excitation functions, σ_γ and σ(LEVEL) reaction cross sections, multipolarities of transitions, different coincidence relations, energies, spins and parities of excited states. The energy levels of the nuclei were calculated on the basis of the parabolic rule derived from the cluster-vibration model. In the case of ^{96}Nb the Racah multipole decomposition method was also used for the theoretical interpretation of the multiplet states. Many proton-neutron, proton-phonon-neutron quasiparticle (and cluster) multiplet states have been identified. Conclusions were drawn on the applicability of the parabolic rule for the theoretical description of multiplet states.

EXCITED STATES OF ^{82}Br FROM (p,nγ) REACTION

T. Fényes, Z. Gácsi, J. Gulyás, T. Kibédi, A. Krasznahorkay, S. László, D. Novák, S. Brant* and V. Paar*

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Physica Scripta 29 (1984) 51-56

EXCITED STATES OF ^{96}Nb FROM ^{96}Zr(p,nγ)^{96}Nb REACTION

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Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 14

EXCITED STATES OF ^{96}Nb FROM ^{96}Zr(p,nγ)^{96}Nb REACTION

B.D. Kern*, T. Fényes, A. Krasznahorkay, Zs. Dombrádi, S. Brant** and V. Paar**

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Nucl. Phys. A430 (1984) 301-320

The γ-ray spectra of the ^{96}Zr(p,nγ)^{96}Nb reaction have been measured with Ge(Li) detectors at different bombarding proton energies between 1.3 and 5.1 MeV. γγ-coincidences were observed at E_p=4.7 and 5.0 MeV. On the basis of experimental results a level scheme of ^{96}Nb was deduced (see fig.), γ-threshold energies and γ-branching ratios were determined. Computed Hauser-Feshbach (p,n') cross sections have been compared with experimental data obtained from the γ-ray measurements, and level spins and parities have been determined. The energies of ^{96}Nb levels were calculated on the basis of the parabolic rule, derived from the cluster-vibration model. The Racah multipole decomposition method was used also for the theoretical interpretation of several ^{96}Nb multiplet states.

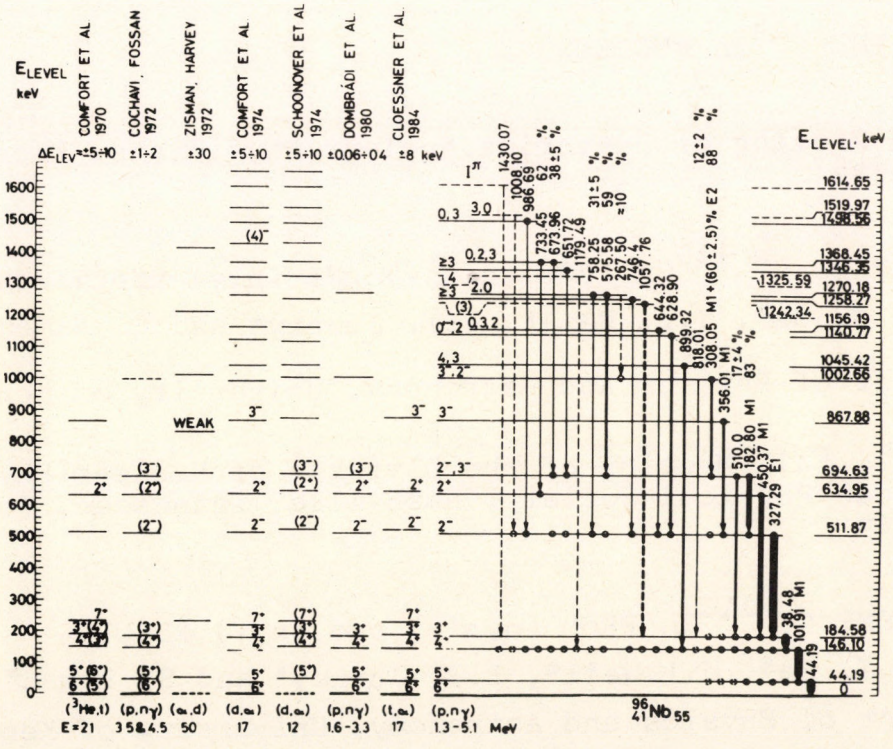

Fig. The energy level diagram of ^{96}Nb

ODD-J—EVEN-J STRAGGLING OR SMOOTH PARABOLAS?

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Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 89

MULTIPOLARITY OF SOME ^{102}Rh TRANSITIONS

Zs. Dombrádi, A. Krasznahorkay, T. Kibédi and S. László

Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 21

PROTON-NEUTRON MULTIPLET STATES IN ^{114}In

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Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 22

STUDY OF THE ^{114}In NUCLEUS

T. Kibédi

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

ENERGY LEVELS OF ^{116}Sn FROM (n,n'γ) AND (n,γ) REACTIONS

Z. Gácsi, J. Sa*, J.L. Weil*, E.T. Jurney* and S. Raman*

*Department of Physics and Astronomy, University of Kentucky, Lexington

Talk, 1984. Fall Meeting of the Division of Nuclear Physics of the American Physical Society, Nashville, Tennessee, October 18-20, 1984

DECAY SCHEME OF ^{116}Sn FROM (n,n'γ) and (n,γ) RESULTS

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5th Int.Symp. on Capture Gamma-Ray Spectroscopy and Related Topics, Knoxville, Tennessee, September 10-14, 1984. Submitted to the Proceedings

DECAY ENERGIES OF NEUTRON DEFICIENT RARE EARTH ISOTOPES

F. Tárkányi

Thesis for the Candidate's Degree, ATOMKI, Debrecen, 1983.
Submitted to the Hungarian Academy of Sciences

Alpha-particle energies and β^+ endpoint energies for mass separated samples of neutron deficient rare earth isotopes (A=128-159) have been measured using semiconductor spectrometers. New isotopes and isomeric states have been identified and new decay schemes have been constructed. Absolute values of the mass excesses were deduced for the members of the alpha- and beta-decay chains through decay energies (A≃128-180). Using the mass values obtained, the proton drip line has been determined (A≃150-180). It has been shown that a number of nuclei earlier known as alpha emitters must be proton emitters. The proton pairing energy on the boundary of the proton stability has also been investigated.

(In Hungarian)

ON THE DECAY SCHEME OF ^{153}Tb ($T_{1/2}$=2.3 DAYS)

K.Ya. Gromov*, V.V. Kuznetsov* and Z. Árvay

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Talk, Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 119

EXPERIMENTAL MOMENTS OF INERTIA IN Pd AND Cd ISOTOPES AND THEIR INTERPRETATION WITHIN THE EXTENDED NILSSON-STRUTINSKY MODEL

W. Klamra*, J. Bialkovski**, L. Hildingsson*, D. Jerrestam*, A. Johnson*, J. Kownacki**, Th. Lindblad*, J. Nyberg*, T. Vertse and T. Bengtsson***

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Nucl. Phys. A431 (1984) 367-380

High-spin properties of even Pd and Cd isotopes have been studied by means of a 118 MeV ^{12}C beam impinging onto a ^{100}Mo target. The γ-rays following the reaction were recorded using six NaI(Tl) detectors in a two-dimensional coincidence arrangement. Energy-correlation spectra were extracted from the coincidence matrix and used to obtain information on the collective moment of inertia $\mathcal{J}^{(2)}$. The gross properties of the behaviour of this moment of inertia are discussed within an extended Nilsson-Strutinsky model. The experimentally observed variation of the moment of inertia at high rotational frequencies is tentatively explained as being due to an increase of $\mathcal{J}^{(2)}_{band}$ as the band approaches its termination.

GAMMA-GAMMA ENERGY CORRELATION STUDIES IN CERIUM ISOTOPES

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**Institute for Nuclear Research, Swierk,
***Institut des Sciences Nucléaires, Grenoble

Physica Scripta 29 (1984) 47-50

The γ-ray deexcitation of high spin states in ^{130,134,136}Ce has been studied when targets of ^{122,128,130}Te are bombarded with ^{12}C-ions of 100 MeV. The γ-rays are detected in a coincidence arrangement consisting of six hexagonal NaI(Tl)-detectors, and from the data recorded γγ-energy correlation matrices and γ-ray multiplicities are deduced. The two heavier isotopes ^{134,136}Ce do not exhibit a clear rotation behaviour but with the light target a valley extending up to E_γ=1.25 MeV is seen in the γγ-energy correlation matrix.

GAMMA-GAMMA ENERGY CORRELATION STUDY OF ^{158,160}Er NUCLEI

B. Nyakó, J.F. Sharpey-Schafer*, R. Aryaeinejad*, J.R. Cresswell*, P.D. Forsyth*, D. Howe*, P.J. Nolan*, M.A. Riley*, J. Simpson*, P.J. Twin**, J. Bacelar***, J.D. Garrett***, G.B. Hagemann***, B. Herskind*** and A. Holm***

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Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ATOMKI Report A/2 (1984) 99

OBSERVATION OF SUPERDEFORMATION IN ^{152}Dy

B. Nyakó, J.R. Cresswell*, P.D. Forsyth*, D. Howe*, P.J. Nolan*, M.A. Riley*, J.F. Sharpey-Schafer*, J. Simpson*, N.J. Ward* and P.J. Twin**

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Phys.Rev.Lett. 52 (1984) 507-510

High-resolution, low-background, two-dimensional γ-ray energy correlations $E(\gamma_1)$ vs $E(\gamma_2)$ have been measured at high spin in ^{152}Dy with the spectrometer TESSA2. Ridges characteristic of rotational behavior are observed for γ-ray energies $0.8 \leq E(\gamma) \leq 1.35$ MeV. The separation of the ridges gives a dynamical moment of inertia $\mathcal{J}_{band}^{(2)} = (85 \pm 2)\hbar^2$ MeV^{-1} indicating a quadrupole deformation of $\varepsilon \approx 0.51$ for a rigid body assuming $\gamma = 0$.

THE SYSTEMATICS OF $h_{11/2}$ PROTON ALIGNMENT IN $^{157,158,159}Er$

M.A. Riley*, J. Simpson*, R. Aryaeinejad*, J.R. Cresswell*, P.D. Forsyth*, D. Howe*, P.J. Nolan*, B. Nyakó, J.F.Sharpey-Schafer*, P.J. Twin**, J. Bacelar***, J.D. Garrett***, G.B. Hagemann***, B. Herskind*** and A. Holm***

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Phys. Lett. 135B (1984) 275-278

Rotational bands have been observed in $^{157,158,159}Er$ to very high spin ($J \sim 41\hbar$). Upbends are found, due to the alignment of two $h_{11/2}$ protons at $0.40 \lesssim \hbar\omega \lesssim 0.46$ MeV in all bands. A systematic shift with neutron number of the band-crossing frequency is observed and is related to a change in quadrupole deformation ε_2.

DESCRIPTION OF GADOLINIUM ISOTOPES IN THE FRAMEWORK OF IBA

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Proc. Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 2, pp. 755-761

In the framework of IBA the energy spectrum and E2- and M1-transition probabilities for nuclei ^{149}Gd and ^{151}Gd have been calculated. A satisfactory agreement with experimental data has been obtained.

INVESTIGATION OF ISOTOPES FAR FROM THE STABILITY LINE

F. Tárkányi

Seminar talk, Institute for Nuclear Study, University of Tokyo; Cyclotron and Radioisotope Center, Tohoku University, Sednai; Tandem Accelerator Center, University of Tsukuba, Ibaraki, 22 November - 21 December, 1984

ABOUT THE INCREASE OF THE RESIDUAL n-p INTERACTIONS IN NUCLEI FAR FROM THE STABILITY LINE

G.D. Alkhazov*, N. Ganbaatar**, K.Ya. Gromov***, V.G. Kalinnikov***, K.A. Mezilev*, Yu.N. Novikov*, A.M. Nurmukhamedov*, A. Potempa**** and F. Tárkányi

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Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 127

Using experimental mass values obtained for A=150-180 neutron deficient nuclei, the residual n-p interaction values were determined for isotopes with N=87 and 85. On the basis of the deduced values, one may conclude that the residual n-p interaction for nuclei with a large neutron deficiency is enhanced.

(In Russian)

ON THE FORM OF HEAVY NUCLEI NEAR THE PROTON DRIP LINE

G.D. Alkhazov*, N. Ganbaatar**, K.Ya. Gromov***, V.G. Kalinnikov***, K.A. Mezilev*, Yu.N. Novikov*, A. Potempa**** and F. Tárkányi

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Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 120

The binding energies of the lost protons and neutrons were determined using experimental mass excess values. The binding energy of the pair of the lost neutrons B_{2n} indicates a departure from the linear dependence of B_{2n} on the number of neutrons at N=89-92 for Er, Yb, Hf and W with a large neutron deficiency. This allows a conclusion that ^{154}Er, ^{156,158}Yb, and probably ^{164}W belong to the transitional nuclei.

(In Russian)

IDENTIFICATION OF THE PROTON DRIP LINE

G.D. Alkhazov*, N. Ganbaatar**, K.Ya. Gromov***, V.G. Kalinnikov***, K.A. Mezilev*, Yu.N. Novikov*, A.M. Nurmukhamedov*, A. Potempa**** and F. Tárkányi

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Izv. Akad. Nauk SSSR Ser. Fiz. 48 (1984) 834-843

The absolute masses of about 40 nuclides far from beta-stability (A≈150-180) are derived from the experimental Q_α, Q_β. From the deduced proton binding energies it is shown that ^{197}Tl, ^{177,176,175,174,173}Au, ^{171,170,169}Ir, ^{166,165}Re and possibly ^{178}Au, ^{172}Ir, ^{171}Tl, ^{155}Lu, ^{151}Tm, known earlier as alpha-decay isotopes, are found unstable to direct proton decay.

The experimental proton drip line has been identified for odd Z elements. It is found that in the boundaries of proton stability the proton pairing energies are about 50 % larger than those for nuclides near the beta stability line.

(In Russian)

RENORMALIZATION OF THE AXIAL VECTOR COUPLING CONSTANT IN HEAVY NUCLEI

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Abstracts of Contributions of 34th Conf. on Nuclear Spectroscopy and Nuclear Structure, Alma-Ata, 17-20 April, 1984 (Nauka, Leningrad, 1984) p. 266. Yad. Fiz. 40 (1984) 554-556

The group of the pure Gamow-Teller transitions in heavy nuclei characterized by anomalously large values of the beta-decay reduced probabilities is investigated. It is seen from the experimental data that we can describe these as spin-flip transitions. The renormalization of the axial-vector coupling constant is derived taking into account the effects of configuration mixing and spin-spin polarization. For heavy nuclei (A~150) the value $g_A/g_V \approx 0.67$ is found, which is twice as low as that for the free nucleon.

(In Russian)

PURE GAMOW-TELLER SPIN-FLIP BETA TRANSITIONS AND THE RENORMALIZATION OF THE AXIAL-VECTOR COUPLING CONSTANT IN HEAVY NUCLEI

G.D. Alkhazov*, S.A. Artamonov*, N. Ganbaatar**, K.Ya. Gromov***
V.I. Isakov*, V.G. Kalinnikov***, K.A. Mezilev*, Yu. N.
Novikov*, A.M. Nurmukhamedov*, A. Potempa**** and F. Tárkányi

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Izv. Akad. Nauk SSSR Ser.Fiz. 48 (1984) 912-918

A large group of the Gamow-Teller transitions has been investigated in the region of heavy nuclei with mass-numbers near A=150. This group of transitions has anomalously large values of reduced beta-decay probabilities for heavy nuclei. The experimental data such as the beta-decay energies, half-lives and the internal conversion coefficients obtained with the IRIS facility together with some information from the literature have allowed us to identify these transitions as spin-flip ones ($\Delta l=0$, $\Delta s=1$). They comprise a considerable part of the total beta-decay intensity. The experimental ft-values have been derived.

The nuclei under investigation are very close to the double magic ^{146}Gd nucleus. The location of these nuclei gives a possibility for the evaluation of reduced probabilities for Gamow-Teller transitions with the help of the shell model with the configuration mixing and spin-spin polarization in the charge-exchange channel.

It has been found for nuclei with neutron number N=82 that we deal with the case of the quenching of the beta(+)-decay strength which may be attributed to the virtual excitations of non-nucleonic degrees of freedom, delta isobars for example. One can take this quenching into account by the effective nuclear renormalization of the axial-vector coupling constant.

The ratio of the effective (renormalized) axial-vector coupling constant to the vector one is found to be within the interval 0.6-0.85.

(In Russian)

ATOMIC PHYSICS

ELECTRON SPECTROSCOPY IN FUNDAMENTAL AND APPLIED RESEARCH

D. Berényi

Acta Phys. Hung. 55 (1984) 7-15

(In Russian)

ATOMIC PHYSICS AT NUCLEAR ACCELERATORS

D. Berényi

Talk, "Physik-Kolloquium Leipzig", Karl Marx University, Leipzig, 24 January, 1984

INVESTIGATIONS IN ATOMIC PHYSICS BY HEAVY ION PROJECTILES

D. Berényi

Proc.Int. School-Seminar on Heavy-Ion Physics, Alushta, 14-21 April, 1983 (JINR, Dubna, 1983, D7-83-644) pp. 489-508

HIGH-ENERGY ION-ATOM COLLISIONS

Á. Kövér

Fiz. Szemle 34 (1984) 284-290

(In Hungarian)

ELECTRONS WITH CONTINUOUS ENERGY DISTRIBUTION FROM ENERGETIC HEAVY ION COLLISIONS

D. Berényi

Lecture, Int.School on Atomic and Nuclear Heavy Ion Interactions, Poiana Brasov, 28 August - 8 September, 1984. Submitted to the Proceedings

STUDY OF INNER SHELL IONIZATION PROCESSES INDUCED BY CHARGED-PARTICLE BOMBARDMENT

B. Schlenk

Thesis for the Doctor of Physical Sciences degree, ATOMKI, Debrecen, 1984. Submitted to the Hungarian Academy of Sciences

(In Hungarian)

IONIZATION OF INNER ATOMIC SHELLS IN HIGH-ENERGY ION-ATOM COLLISIONS

L. Sarkadi

Thesis for the Candidate of Physical Sciences degree, ATOMKI, Debrecen, 1984. Submitted to the Hungarian Academy of Sciences

(In Hungarian)

ROLE OF ATOMIC PHYSICS IN THE RESEARCH OF NEW ENERGY RESOURCES

D.Berényi

Talk, Seminars on Research of New Energy Resources, Debrecen, 13-14 February, 1984

INVESTIGATION OF ELECTRONS EMERGING FROM ION-ATOM COLLISIONS

Á. Kövér

Talk, Seminars on Research of New Energy Resources, Debrecen, 13-14 February, 1984

RESULTS ON X-RAY EMISSION IN ATOMIC COLLISIONS

I. Török

Talk, Seminars on Research of New Energy Resources, Debrecen, 13-14 Februrary, 1984

ANALYTIC ELASTIC ATOMIC FORM FACTORS

G. Hock

Poster, Abstracts of Int.Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part I, pp. 192-193

COMPARISON OF CALCULATIONS OF EFFECTIVE CHARGES IN ION-ATOM COLLISIONS

G. Hock, B. Sulik, J. Végh, I. Kádár, S. Ricz and D. Varga

Talk, 2nd Int. Workshop on Cross Sections for Fusion and Other Applications, College Station, Texas, November 8-10, 1984. Submitted to the Proceedings, Nucl. Instr. and Meth.

The effect of the static screening of the projectile on the differential and total cross sections of the direct Coulomb ionization, calculated by different methods in the Born and binary encounter approximations, are examined together with the effective ionizing projectile charges defined in these calculation procedures. Comparison is made with the effective charges determined in ion-atom collisions.

CHARGE SCALING OF IONISATION PROBABILITIES IN ION-ATOM COLLISIONS FOR ZERO IMPACT PARAMETER

B. Sulik, G. Hock and D. Berényi

J. Phys. B 17 (1984) 3239-3244

A simple encounter probability model for approximating the mean L-shell ionization probability at zero impact parameter, $p_L(0)$, used in the multiple ionization theories of heavy-ion collisions, is constructed. The model establishes a simple

scaling rule for $p_L(0)$ as a function of Z_1/v_i which behaves asymptotically as $p_L(0) \approx (Z_1/v_i)^2$ for low projectile charge Z_1 and tends to unity for high Z_1 values, in the high speed limit $v_i \gg v_a$.

GEOMETRICAL ENCOUNTER PROBABILITY MODEL IN THE DESCRIPTION OF MULTIPLE IONIZATIONS BY FAST HEAVY IONS

B. Sulik and G. Hock

Talk, 2nd Workshop on High-Energy Ion-Atom Collision Processes, Debrecen, August 27-28, 1984. Submitted to the Proceedings

ATOMIC AND TARGET EFFECTS ON THE IN-BEAM CONVERSION LINES DUE TO THE RECOIL IONISATION

L. Végh

Poster, Abstracts of Int.Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, ATOMKI Report A/2 (1984) 80

MULTIPLE IONISATION IN MEAN ELECTRON FIELD BORN APPROXIMATION

L. Végh

Poster, Abstracts of Int.Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, pp. 489-490

MEAN-ELECTRIC-FIELD BORN APPROXIMATION TO MULTIPLE IONISATION IN DISTANT COLLISIONS

L. Végh

Submitted to Phys. Rev. A

The description of ion-atom collisions in mean-electric-field approximation is discussed. In this method the sum of the interactions between the projectile and the electrons of the target is expressed as the sum of the Coulomb field acting on the centre of charge of the target electrons and a residual interaction. For distant (high-energy) collisions the residual interaction can be neglected. The calculation of the scattering amplitude corresponding to the mean field is performed within the framework of the first Born approximation. It is shown that for high energy collisions the scattering amplitude is a product of single-electron scattering amplitudes and the cross sections of the multiple ionisation follow the binomial distribution. A simple expression is derived for the cross section of the n-vacancy production. The calculated ionisation cross sections and mean numbers of outer shell vacancies in the presence of an inner shell vacancy are in a satisfactory agreement with experimental values for high projectile energies.

ELECTRON CAPTURE EFFECTS ON THE CONVERSION LINE SHAPE IN IN-BEAM EXPERIMENTS

L. Végh

Poster, Abstracts of Int.Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, pp. 487-488

AUGER ELECTRONS FROM HIGH ENERGY HEAVY ION COLLISIONS

D. Berényi

Talk, Abstracts of Int. Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part I, p. 47

RELATIONSHIP BETWEEN THE CENTROID ENERGY OF THE AUGER SPECTRA AND THE MEAN VACANCY PRODUCTION

L. Végh

Phys.Rev. A 30 (1984) 2127

The linear relationship between the mean number of multiple ionized outer-shell electrons and the centroid energy of the corresponding Auger spectra, established experimentally, is discussed. The origin of this trend can be explained by the equidistant energies of the satellite line-groups in the Auger spectra.

ON THE STUDY OF THE ELECTRON SPECTRUM OF THE REACTION Ne^{n+}+Ne

D. Varga, J. Végh, I. Kádár, V.N. Mel'nikov*, S. Ricz, B. Sulik, V.A. Shchegolev*, D. Berényi, Á. Kövér and I. Cserny

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Abstracts of Conf. on the Experimental Facility U-400 and the Physical Programme of the First Scheduled Experiments, Dresden, 30 September, 1982 (JINR, Dubna, 1982, D7-82-891) pp. 82-83

(In Russian)

STUDY OF THE AUGER SPECTRUM OF THE NEON ATOM IN COLLISIONS WITH NEON AND ARGON IONS AT E=5.6 MeV/NUCLEON

D. Varga, J. Végh, I. Kádár, S. Ricz, B. Sulik, V.A. Shchegolev* and D. Berényi

*JINR, Dubna

Proc. Int. School-Seminar on Heavy-Ion Physics, Alushta, 14-21 April, 1983 (JINR, Dubna, 1983, D7-83-644) pp. 509-517

(In Russian)

HIGH RESOLUTION SPECTRA OF AUGER ELECTRONS FROM 5.5 MeV/amu Ne^{3+}-Ne and Ar^{6+}-Ne COLLISIONS

S. Ricz, I. Kádár, D. Varga, J. Végh, T. Borbély*, V.A. Shchegolev**, D. Berényi, G. Hock and B. Sulik

*Clinic of Radiology, Medical University, Debrecen
**JINR, Dubna

Talk, 2nd Workshop on High-Energy Ion-Atom Collision Processes, Debrecen, August 27-28, 1984. Submitted to the Proceedings

HIGH RESOLUTION SPECTRA OF AUGER ELECTRONS FROM Ne^{n+}, Ar^{n+} (5.5 MeV/amu) - Ne COLLISIONS

S. Ricz, I. Kádár, D. Varga, J. Végh, T. Borbély*, V.A. Shchegolev**, D. Berényi, G. Hock and B. Sulik

*Clinic of Radiology, Medical University, Debrecen
**JINR, Dubna

Poster, Abstracts of Int. Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, pp. 376-377

HIGH RESOLUTION SPECTRA OF AUGER ELECTRONS FROM 5.5 MeV/amu Ne^{3+}-Ne and Ar^{6+}-Ne COLLISIONS

S. Ricz, I. Kádár, D. Varga, J. Végh, T. Borbély*, D. Berényi, G. Hock and B. Sulik

*Clinic of Radiology, Medical University, Debrecen

Poster, 8th Conf. on the Application of Accelerators in Research and Industry, Denton, Texas, November 12-14, 1984

AUGER ELECTRON SPECTRA IN 5.5 MeV/amu Ne^{q+} AND Ar^{q+} ION IMPACT ON Ne

I. Kádár, S. Ricz, V.A. Shchegolev*, B. Sulik, D. Varga, J. Végh, D. Berényi and G. Hock

*JINR, Dubna

Poster, Int. Conf. on the Physics of Highly Ionized Atoms, Oxford, July 2-5, 1984

AUGER ELECTRON SPECTRA IN 5.5 MeV/amu Ne^{q+} AND Ar^{q+} ION IMPACT ON Ne

I. Kádár, S. Ricz, V.A. Shchegolev*, B. Sulik, D. Varga, J. Végh, D. Berényi and G. Hock

*JINR, Dubna

Submitted to J. Phys. B

STUDY OF ELECTRONS EMERGING FROM He^+, He^{++}-He ION-ATOM COLLISION PROCESSES AT 0^o

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*Technical University of Heavy Industry, Miskolc

Ph.D.thesis (supervisor: D. Berényi), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen

(In Hungarian)

A STUDY OF THE ELECTRON SPECTRA AROUND 0^o FOR SIMPLE COLLISION SYSTEMS IN THE 0.8-2.4 MeV IMPACT ENERGY REGION

Á. Kövér, E. Szmola*, Gy. Szabó, G. Hock, D. Berényi, L. Gulyás, E. Koltay, M. Burkhard** and K.-O. Groeneveld**

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Talk, 2nd Workshop on High-Energy Ion-Atom Collision Processes, Debrecen, August 27-28, 1984. Submitted to the Proceedings

INVESTIGATION OF ELECTRON SPECTRA FROM He^+, He^{++}-He COLLISIONS IN THE FORWARD DIRECTION

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**Institute for Nuclear Physics, University of Frankfurt/M

Poster, Abstracts of Int.Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part I, pp. 256-257

TARGET IONIZATION AND PROJECTILE ELECTRON LOSS IN SIMPLE COLLISION SYSTEMS

J. Schader*, R. Latz*, M. Burkhard*, H.J. Frischkorn*, D. Hofmann*, P. Koschar*, K.-O. Groeneveld*, D. Berényi, Á. Kövér and Gy. Szabó

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J. Physique Lett. 45 (1984) L-249—L-254

Absolute double differential cross sections for target ionization and projectile electron loss were measured in collisions of H^+, H_2^+, $^3He^+$ and $^3He^{++}$ (0.4 to 2.0 MeV/u) with He and Ar at electron emission angles from 0^o up to 60^o. The experimental results are qualitatively well described by plane wave Born approximations including projectile screening.

CUSP STUDIES FOR SIMPLE COLLISION SYSTEMS

D. Berényi, L. Gulyás, Á. Kövér, E. Szmola*, Gy. Szabó, M. Burkhard** and K.-O. Groeneveld**

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**Institute for Nuclear Physics, University of Frankfurt/M

Poster, Proc. Symp. on Forward Electron Ejection in Ion Collisions, Aarhus, June 29-30, 1984, ed. K.-O. Groeneveld, W. Meckbach and I.A. Sellin, Lecture Notes in Physics 213 (Springer, Berlin, 1984) pp. 71-74

INVESTIGATION OF THE PROJECTILE ATOMIC NUMBER DEPENDENCE OF THE L-SUBSHELL IONIZATION

T. Papp, J. Pálinkás, L. Sarkadi, B. Schlenk, I. Török and K. Kiss

Nucl. Instr. and Meth. B4 (1984) 311-315

SECOND ORDER CALCULATIONS FOR L-SHELL IONIZATION OF GOLD BY NITROGEN ION IMPACT

L. Sarkadi and T. Papp

Submitted to Acta Physica Hungarica

A comparison has been made between the predictions of the recent second order theory of Sarkadi and Mukoyama [1] and experimental cross sections of L-subshell ionization of gold by nitrogen ions in the energy range 2.4-18.2 MeV [2]. Considerable improvement has been observed compared to the previous two-step model [3] which neglects the possible interference effects between the ionization amplitudes of first - and second order processes.

References

[1] L. Sarkadi and T. Mukoyama, Proc. Third Workshop on Inner Shell Ionization by Light Ions, Linz, Austria, 1983, to be published in Nucl. Instr. and Meth.
[2] J. Pálinkás, L. Sarkadi, B. Schlenk, I. Török, Gy. Kálmán, C. Bauer, K. Brankoff, D. Grambole, C. Heiser, W. Rudolph and H. J. Thomas, IEEE Trans. Nucl. Sci., Vol. NS-30 (1983) 970
[3] L. Sarkadi and T. Mukoyama, J. Phys. B: Atom. Molec. Phys. 14 (1981) L255

INVESTIGATION OF THE MULTIPLE IONIZATION EFFECT ON THE L_3-SUBSHELL ALIGNMENT

T. Papp

Talk, 2nd Workshop on High-Energy Ion-Atom Collision Processes, Debrecen, August 27-28, 1984. Submitted to the Proceedings

STUDY OF THE L-SHELL IONISATION OF GOLD BY 3.0-18.2 MeV NITROGEN-ION BOMBARDMENT

J. Pálinkás, L. Sarkadi, B. Schlenk, I. Török, Gy. Kálmán, C. Bauer*, K. Brankoff*, D. Grambole*, C. Heiser*, W. Rudolph* and H.J. Thomas*

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J. Phys. B 17 (1984) 131-145

COULOMB DEFLECTION EFFECTS IN L-SUBSHELL IONIZATION

T. Papp, B. Schlenk and K. Kiss

Poster, Abstracts of Int.Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, p. 347

INVESTIGATION OF L-SUBSHELL IONIZATION OF GOLD BY LOW VELOCITY PROTON BOMBARDMENT

K. Kiss, T. Papp, J. Pálinkás, L. Sarkadi and B. Schlenk

Submitted to Acta Phys. Hung.

Proton induced X-ray emission has been used to measure absolute L-subshell and total L-shell ionization cross sections of gold in the energy range of 0.2-0.6 MeV. The experimental results were compared with the predictions of the relativistic plane wave Born approximation corrected for the binding energy and Coulomb-deflection effects (RPWBA-BC) [1] and with the predictions of the PWBA theory including the Coulomb-deflection, the perturbed stationary states and the relativistic effects (CPSSR) [2]. Both theories well describe the experimental results over the energy range studied.

[1] T. Mukoyama and L. Sarkadi, Bull. Inst. Chem Res. Kyoto Univ. 57 (1973) 33
[2] W. Brandt and G. Lapicki, Phys. Rev. A10 (1974) 474

ELECTRON CAPTURE TO CONTINUUM STATES FROM INNER SHELLS

L. Sarkadi, J. Bossler*, R. Hippler* and H.O. Lutz*

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Phys. Rev. Lett. 53 (1984) 1551-1554

INNER-SHELL VACANCY PRODUCTION BY ELECTRON CAPTURE INTO THE CONTINUUM STATES OF THE PROJECTILE

L. Sarkadi, J. Bossler*, R. Hippler* and H.O.Lutz*

*Fakultät für Physik, Universität Bielefeld

Talk, Abstracts of Int. Conf. on X-Ray and Inner-Shell Processes in Atoms, Molecules and Solids, Leipzig, August 20-24, 1984, Part II, pp. 399-400

HIGHER ORDER PROCESSES IN L-SHELL IONIZATION

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Nucl. Instr. and Meth. B4 (1984) 296-302

L-SHELL VACANCY PRODUCTION BY ELECTRON CAPTURE TO PROJECTILE-CENTERED CONTINUUM STATES (ECC) IN PROTON-ARGON COLLISIONS

L. Sarkadi, J. Bossler*, R. Hippler* and H.O. Lutz*

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Talk, Proc. Symp. on Forward Electron Ejection in Ion Collisions, Aarhus, June 29-30, 1984, ed. K.-O. Groeneveld, W. Meckbach and I.A. Sellin, Lecture Notes in Physics 213 (Springer, Berlin, 1984) pp. 91-93

ION-INDUCED L_3-SUBSHELL ALIGNMENT OF ARGON

D. Berényi, I. Cserny, I. Kádár, Á. Kövér, S. Ricz, L. Sarkadi, D. Varga and J. Végh

J. Phys. B 17 (1984) 829-834

CARBON AUGER ELECTRON LINE SHAPE AFTER BEAM-FOIL EXCITATION OF MOLECULAR IONS

P. Koschar*, H.J. Frischkorn*, K.-O. Groeneveld* and Gy. Szabó

*Institute for Nuclear Physics, University of Frankfurt/M

Z. Physik A 315 (1984) 13-19

Auger electrons of beam-foil excited C-projectiles and C-fragments of Coulomb exploding molecular CO-projectiles at 83 keV/u yield information on the excitation mechanisms and the interaction with the solid. A numerical procedure is developed to calculate the mean energy of the Coulomb explosion, the charge states of the fragment ions and their angular straggling behaviour inside the solid. The calculated results are compared with experimental data. From a detailed line shape calculation the magnitude of directional effects induced by the Wake potential can be predicted.

ANALYTICAL APPLICATIONS

THE GROWING IMPORTANCE OF INTER- AND MULTIDISCIPLINARY WORK IN PHYSICAL RESEARCH

D. Berényi (editor)

Fiz. Szemle 34 (1984) 201-215

(In Hungarian)

METHODS FOR ANALYSIS OF DIFFERENT SAMPLES IN ATOMKI

D. Berényi

Seminar talk, Section of Physics and Chemistry, Karl Marx University, Leipzig, 24 January, 1984

PROTON INDUCED X-RAY EMISSION METHOD AND ITS ANALYTICAL APPLICATION

Gy. Szabó

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984. Finommechanika-Mikrotechnika 23 (1984) 161-164

(In Hungarian)

PHYSICAL BASIS AND INSTRUMENTATION FOR PIXE

E. Koltay

Lecture, IAEA Int. Training Course on Research and Application of Energy Dispersive X-Ray Fluorescence Analysis, National University of Singapore, May 10, 1984

PIXE METHOD IN AIR POLLUTION STUDIES

E. Koltay

Lecture, IAEA Int. Training Course on Research and Application of Energy Dispersive X-Ray Fluorescence Analysis, National University of Singapore, May 21, 1984

COMPARISON OF X-RAY ANALYSIS WITH PROTON EXCITED GAMMA MEASUREMENTS AND RUTHERFORD BACKSCATTERING

E. Koltay

Lecture, IAEA Int. Training Course on Research and Application of Energy Dispersive X-Ray Fluorescence Analysis, National University of Singapore, June 1, 1984

PIXE METHOD: BASIC EFFECTS AND INSTRUMENTATION

E. Koltay

Lecture, IAEA Int. Training Course on Energy Dispersive X-Ray Analysis, Jožef Stefan Institute, University of Ljubljana, 5 November, 1984

COMMENTS ON THE APPLICATION OF PIXE IN INVESTIGATIONS RELATED TO ATMOSPHERIC PHYSICS

E. Koltay

Lecture, IAEA Int. Training Course on Energy Dispersive X-Ray Analysis, Jožef Stefan Institute, University of Ljubljana, 8 November, 1984

EXOTIC METHODS II: PROTON MICROBEAMS

E. Koltay

Lecture, IAEA Int. Training Course on Energy Dispersive X-Ray Analysis, Jožef Stefan Institute, University of Ljubljana, 12 November, 1984

ACCELERATOR BASED NUCLEAR ANALYTICAL METHODS: PIGE AND RBS

E. Koltay

Lecture, IAEA Int. Training Course on Energy Dispersive X-Ray Analysis, Jožef Stefan Institute, University of Ljubljana, 12 November, 1984

PIXE ACTIVITIES IN ATOMKI

I. Kiss, E. Koltay and Gy. Szabó

Seminar talk, Institute for Nuclear Study, University of Tokyo, 27 November, 1984; National Laboratory for High Energy Physics, Monbusho, 17 December, 1984

ACCELERATOR BASED MICROANALYTICAL INVESTIGATIONS IN ATOMKI

Á.Z. Kiss, I. Kiss, E. Koltay, B. Nyakó, E. Somorjai, Gy. Szabó and L. Zolnai

Seminar talk, Institute of Physical and Chemical Research, Wako-Shi, Saitama, 28 November, 1984

ON THE PHYSICAL PROCESSES UNDERLYING PIXE AND PIGE ANALYTICAL METHODS

E. Koltay

Seminar talk, Research Center of Ion Beam Technology, Hosei University, Tokyo, 29 November, 1984

THE APPLICATION OF PIXE AND PIGE MICROANALYTICAL METHODS IN ATOMKI

Á.Z. Kiss, I. Kiss, E. Koltay, B. Nyakó, E. Somorjai, Gy. Szabó and L. Zolnai

Seminar talk, Cyclotron and Radioisotope Center, Tohoku University, Sendai, 5 December, 1984

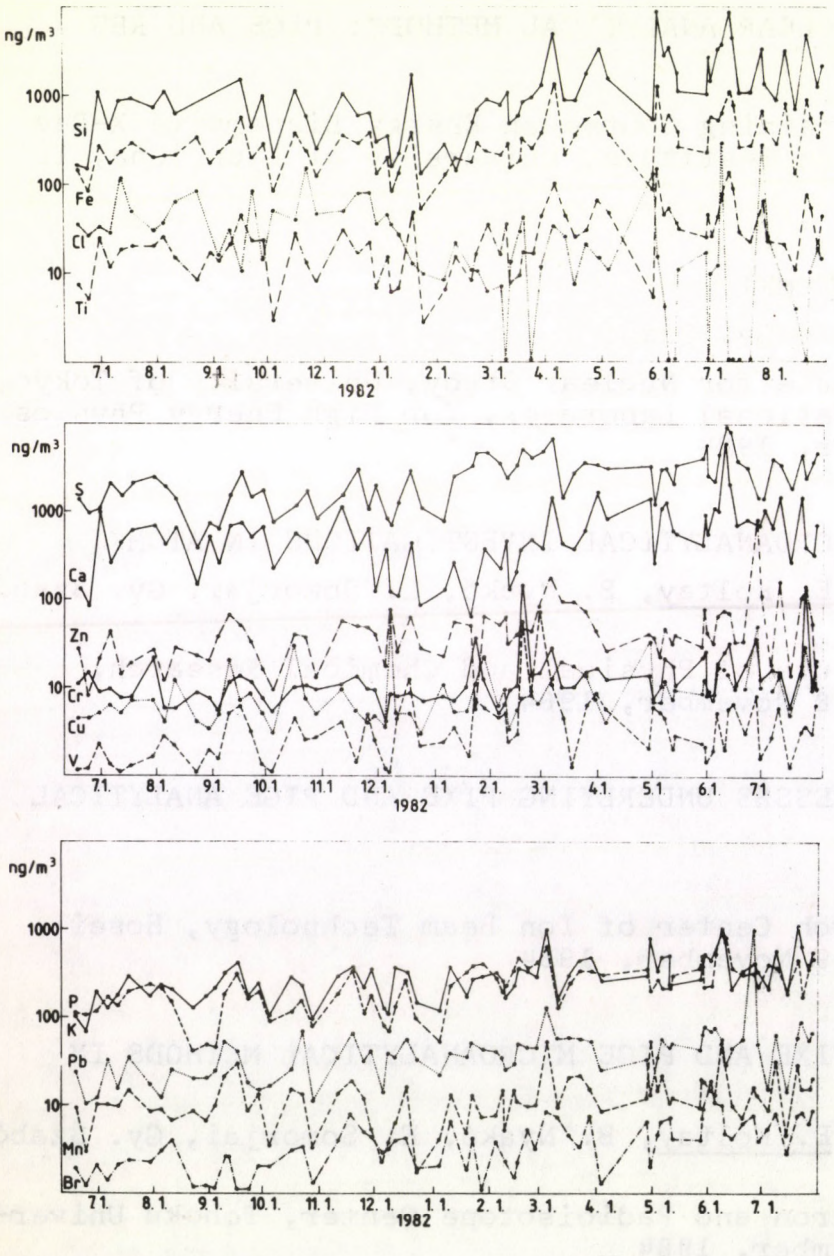
TRACE ELEMENT CONCENTRATIONS IN ATMOSPHERIC AEROSOL OVER HUNGARY

Á. Mészáros*, L. Haszpra*, I. Kiss, E. Koltay, S. László and Gy. Szabó

*Institute for Atmospheric Physics, Budapest

Talk, 11th Int. Conf. on Atmospheric Aerosols, Condensation and Ice Nuclei, Budapest, 3-8 September, 1984, Preprint Vol.I, p.113

Seventy filter samples of atmospheric particles collected during one year at a rural site were analysed up to 20 elements by PIXE. The average concentrations and enrichment factors are presented and discussed. The most abundant element was sulphur (2270 ng m^{-3}), which had no seasonal variation, while other pollution elements like non-crustal V and As had 2.5 times higher average concentrations in winter than in summer. Soil derived elements had their maximum concentrations in summer.



The interelement correlation matrix and factor analysis showed that four factors were sufficient to account for 77 and 75 % of the total variance in winter and summer, respectively, but the very complex factor loading structure did not allow an exact source apportionment.

ON THE METHODOLOGY OF PIXE MICROANALYTICAL MEASUREMENTS

I. Kiss, E. Koltay, Gy. Szabó and L. Zolnai

Seminar talk, Department of Nuclear Engineering, Kyoto University, 11 December, 1984

PIXE ANALYSIS OF THIN SAMPLES

I. Kiss, E. Koltay, Gy. Szabó, S. László and Á. Mészáros*

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Talk, Proc. Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 79-82

(In Hungarian)

ANALYSES OF MICRO AN MACRO ELEMENTS DURING PREGNANCY BY PIXE

S. Gődény*, I. Kiss, E. Koltay and Gy. Szabó

*Department of Obstetrics and Gynaecology, Medical University, Debrecen

Talk, Summaries of 22nd Meeting of the Hungarian Gynaecological Society, Szeged, 5-8 September, 1984, p. 420

(In Hungarian)

AMBIGUITIES IN PIGE CAUSED BY DIFFERENT REACTIONS

Á.Z. Kiss, E. Koltay, B. Nyakó, E. Somorjai, A. Anttila* and J. Raisanen*

*Department of Physics, University of Helsinki

Submitted to 5th Int.Symp. on Capture Gamma-Ray Spectroscopy and Related Topics, Knoxville, Tennessee, 10-14 September, 1984

PIXE ELEMENTAL ANALYSIS OF ERYTHROCYTE AND BLOOD PLASMA SAMPLES FROM HUMAN PREGNANCIES

I. Kiss, E. Koltay, S. László, Gy. Szabó, S. Gődény* and S. Seif El-Nasr**

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**Teachers' College for Women, Samia (Kuwait)

J. Radioanal. Nucl. Chem., Articles 83 (1984) 175-185

Elemental concentrations of P, S, Cl, K, Ca, Fe, Ni, Cu, Zn, Br, Rb have been determined in erythrocyte and blood plasma samples from normal and diabetic human pregnancies. Average values, the dependence of the concentrations on the time during

gestation period, the correlation coefficients for pairs of elements as well as for the same elements in plasma and erythrocyte samples are given. A marked difference appeared in a number of cases between normal and diabetic pregnancies.

ANALYTICAL APPLICATION OF CYCLOTRONS IN INDUSTRY

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*Research Institute of Aluminium Industry, Budapest

Fiz. Szemle 34 (1984) 9-13

(In Hungarian)

TRACE ELEMENT ANALYSIS BY USING DIRECT CPAA METHOD

S. Takács, F. Ditrói and I. Mahunka

Poster, Abstracts, 8th Conf. on the Application of Accelerators in Research and Industry, Denton, Texas, November 12-14, 1984, Bull. Am. Phys. Soc. 29 (1984) 1116

Multielemental trace analysis was performed on purified industrial aluminium samples and Kryal Ultra-High-Purity Al standards produced by VAW (FRG), at Turku Cyclotron Laboratory, by using the direct CPAA method (Charged Particle Activation Analysis). Both types of Al were expected to contain less than 10 ppm trace element contamination. Proton beams of 8-10 MeV were used for irradiation produced by a small compact cyclotron. The absolute trace quantities were determined for some ten elements by using the cross-section curves and calculating the ranges of the bombarding particles in the samples, and measuring the absolute beam current and the intensities of the characteristic gamma lines of the activated trace elements. The investigated elements are: Ca, Ti, V, Cr, Fe, Ni, Cu, Zn, Ga, Br and Zr. Having the necessary corrections, the results were in good agreement with the predicted (VAW) data.

POSSIBILITIES OF ACTIVATION ANALYSIS ON A CYCLOTRON

S. Takács

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

A SURVEY OF THE POSSIBLE INDUSTRIAL APPLICATIONS OF THE DEBRECEN CYCLOTRON

F. Ditrói, S. Takács and F. Tárkányi

Submitted to ATOMKI Közl.

(In Hungarian)

NEW METHODS AND DEVICES FOR SURFACE SCIENCE

Gy. Bibok and D. Berényi

Talk, 2nd Int.Conf. of Scientists and Specialists of the COMECON Countries on Scientific Instrumentation, Plovdiv, 26 September, 1984

INVESTIGATION OF SURFACE OXIDE LAYERS OF Al-Mg-Zn ALLOYS AND AIR POLLUTION INVESTIGATIONS USING THE XPS (ESCA) METHOD

J. Tóth

Ph.D. thesis (supervisor: L. Kövér), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen

(In Hungarian)

XPS INVESTIGATION ON SURFACE CORROSION OF CONDENSER TUBES IN POWER PLANTS

J. Tóth, L. Kövér and I. Cserny

Proc. 5th Seminar on Electron Spectroscopy of Socialist Countries, Dresden, 26-29 August, 1984 (Dresden Technical University, 1984) p. 149

STUDIES OF INITIAL OXIDATION OF NICKEL-CHROMIUM ALLOYS—SURFACE ANNEALING BY HYDROGEN ION TREATMENT

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*Surface Science Western, The University of Western Ontario, London, Ontario

Submitted to J. Vac. Sci. Technol. A

NOVEL RESULTS AND THEIR APPLICATIONS IN HUNGARY

L. Kövér

Amendment to chapter "Photo-electron spectroscopy" of the book "Analysis of Solid Samples with Electrons, Ions and X-Ray" by O. Brümmer, J. Heydenreich, K.H. Krebs and H.G. Schneider. Hungarian translation (Müszaki Könyvkiadó, Budapest, 1984) pp. 340-344

(In Hungarian)

ELECTRON SPECTROSCOPY AND SURFACE ANALYSIS IN ATOMKI

L. Kövér

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984. Finommechanika—Mikrotechnika 23 (1984) 257-263

(In Hungarian)

CHANNELLING EFFECTS IN POLYCRYSTALLINE COPPER—A SERIOUS IMPEDIMENT TO QUANTITATIVE AUGER ANALYSIS?

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*Surface Science Western, University of Western Ontario, London, Ontario

Submitted to Surface and Interface Analysis

AUTORADIOGRAPHY WITH PLASTIC TRACK DETECTORS

G. Somogyi

Invited talk, 14th Int. Symp. on Autoradiography, Reinhardsbrunn, 19-23 November, 1984

AUTORADIOGRAPHY WITH TRACK TECHNIQUE

G. Somogyi

Seminar talk, Vietnam National Atomic Energy Institute, Hanoi, 26 December, 1984

THE USE OF TRACK TECHNIQUE IN AUTORADIOGRAPHY

G. Somogyi

Seminar talk, Center of Nuclear Technique, Hochiminh City, 12 December, 1984

CAN WE USE CR-39 TRACK DETECTOR FOR NITROGEN MAPPING?

G. Somogyi, Zs. Varga, I. Hunyadi, K. Freyer* and H.Ch. Treutler*

*Central Institute of Isotope and Radiation Research, Leipzig

Talk, 14th Int.Symp. on Autoradiography, Reinhardsbrunn, 19-23 November, 1984

The utility of different CR-39 products to proton track detection has been analysed. The possibility of using these detectors for nitrogen distribution measurements via $^{14}N(n,p)^{14}C$ reaction is studied. The impurity content of CR-39 products is analysed by nuclear analytical methods. It is found that the main contaminant is chlorine. The variation of the background track density induced by monoenergetic thermal neutrons in the bulk of the CR-39 detector is examined. An analysis of the experimental data has led to the conclusion that air nitrogen diffusing into the detector is a significant source of background tracks. A procedure to decrease this nitrogen content in the detector is proposed. The sensitivity of nitrogen determination by using proton track registration in CR-39 detectors is estimated.

XRF SPECTROMETER AND ITS ANALYTICAL APPLICATIONS

J. Bacsó

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984

ISOTOPE EXCITED XRF AND ITS APPLICATION TO INTERDISCIPLINARY FIELDS

J. Bacsó

Seminar talk, Institute of Inorganic Chemistry, University of Münster, 5 July, 1984

SURVEY OF POSSIBLE IMPLEMENTATIONS OF X-RAY FLUORESCENCE ANALYSIS

L. Andó

ATOMKI Report X/8 (1984)

(In Hungarian)

PORTABLE X-RAY FLUORESCENCE ANALYSER WITH INCREASED PRECISION BY USING THE METHOD OF BALANCED FILTERS

E. Vatai and L. Andó

Submitted to X-Ray Spectrometry

ACCURACY OF ANALYSIS WITH RFA-2 USING Fe, Cu and Ge ANODES

E. Vatai and L. Andó

Talk, Proc. Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 11-13

(In Hungarian)

SIMPLE THIN-LAYER METHOD FOR THE DETERMINATION OF THE COMPOSITION OF ALLOYS WITH X-RAY FLUORESCENCE ANALYSIS

G. Kalinka

Talk, Proc.Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 1-6

(In Hungarian)

APPLICATION OF AN EMPIRICAL-CORRECTION METHOD TO THE ANALYSIS OF COPPER ALLOYS

P. Kovács and M. Kis-Varga

Talk, Proc.Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984,

ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 43-54

(In Hungarian)

QUALITATIVE AND QUANTITATIVE DETERMINATION OF THE MECHANICAL CONTAMINANTS OF BEARINGS WITH X-RAY FLUORESCENCE SPECTROMETER

Z. Nemes*, L. Várallyai*, V. Csató* and J. Bacsó

*Anti-friction Bearing Works, Debrecen

Talk, Proc.Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 37-39

(In Hungarian)

DETERMINATION OF URANIUM WITH ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS

G. Kalinka and S. Olivares Rieumont*

*Universidad de la Habana

Talk, Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984

ANALYSIS OF ARCHEOLOGICAL SAMPLES WITH THE X-RAY FLUORESCENCE METHOD

M. Kis-Varga and L. Költő*

*Headquarters, Somogy County Museums, Kaposvár

Talk, Proc.Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 85-90

(In Hungarian)

INVESTIGATION ON THE ACCUMULATION OF LEAD AND OTHER METALS IN PLANTS CAUSED BY MOTOR-TRAFFIC AND SMELTING

J. Bacsó, M. Kis-Varga, P. Kovács and G. Kalinka

J. Radioanal. and Nucl. Chem., Articles 81 (1984) 59-65

X-RAY FLUORESCENCE ANALYSIS AND ITS POSSIBLE APPLICATION IN AGRICULTURE

J. Bacsó and G. Kalinka

Talk, Symp. on the Application of Spectrochemical Analytical Techniques in Agriculture and Environment Protection, Gödöllő, 2-3 April, 1984

APPLICATION OF XRF IN MEDICINE

J. Bacsó

Seminar talk, Faculty of Nuclear Engineering, Polytechnic, Prague, 18 June, 1984

SHORT TERM AND LONG TERM VARIATIONS OF Ca CONCENTRATION IN BEARD

J. Bacsó

J. Radioanal. and Nucl. Chem., Articles 83 (1984) 167-173

The Ca concentration has been measured in daily shaven beard samples over a seven-year period. The Ca concentration range in beard of single individuals is the same as that in the head hair of different groups. Individuals belonging to the group with low Ca level (Ca<700 ppm) in hair (endangered group from ischaemic heart diseases) may increase the Ca level in their hair and get into the group with high Ca level (Ca>700 ppm; defended group).

DETERMINATION OF GOLD ACCUMULATION IN HUMAN TISSUES CAUSED BY GOLD THERAPY USING X-RAY FLUORESCENCE ANALYSIS

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*Department of Pathological Anatomy, Medical University, Debrecen

Talk, Proc. Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 91-95

(In Hungarian)

RELATIONSHIP BETWEEN THE Ca CONTENTS OF THE AORTA AND OF THE HAIR: A POSSIBLE EARLY DIAGNOSIS OF ATHEROSCLEROSIS

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Talk, Proc.Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 96-101

THE CORRELATION BETWEEN HEART DISORDERS AND THE Ca CONTENT IN THE HAIR (APPLICATION OF NUCLEAR ANALYTICAL TECHNIQUES IN MEDICAL SCIENCES)

J. Bacsó

Seminar talk, School of Medicine, University of Zambia, Lusaka, 11 September, 1984

HAIR Ca LEVEL OF CARDIAC, POST-INFARCTION PATIENTS AS WELL AS OF CONTROL AND UNSELECTED ADULTS

J. Bacsó, M. Horváth*, S. Horváth** and M. Szücs***

*Hospital for Cardiology, Balatonfüred
**Department of Pulmonary Diseases, Medical University, Debrecen
***Health Centre, Anti-friction Bearing Works, Debrecen

Poster, 9th European Congress of Cardiology, Düsseldorf, 8-12 July, 1984

INVESTIGATION OF THE METABOLISM OF K AND Ca THROUGH THE MEASUREMENT OF THEIR CONCENTRATIONS IN THE HAIR

J. Bacsó, I. Uzonyi and P. Kovács

Poster, 17th Conf. of the Permanent Working Party of Socialist Countries on Cosmic Biology and Medicine, Brno, 10-16 June, 1984

MICRONUTRIENT DEFICIENCY OF FORAGE PLANTS ON THE PASTURE LANDS OF SOME ALKALINE SOLONETZ SOILS IN HUNGARY

A. Szalay, Z. Sámsoni and Z. Siroky*

*University of Agriculture, Debrecen

Talk, Proc. Int. Symp. on Sheep Production on Big Farms, Debrecen, 14-16 August, 1984 (University of Agriculture, Debrecen, 1984) pp. 88-94

Mn and Cu DEFICIENCY OF PLANTS ON LOWMOOR PEAT SOILS AND ITS REMEDY

A. Szalay

Trace Elements in Animal Nutrition, ed. J. Bokori (Vetenirary University, Budapest, 1983) pp. 45-51

STUDIES ON THE INTERNAL GAS COMPOSITION OF THE WHEAT STALK

P. Bornemisza, F. Sági*, G. Langer, B. Schlenk and L. Mózsik*

*Cereal Research Institute, Szeged

Wiss.Z. Humbold-Universität (Berlin) Math.-Nat. R. 23 (1984) 302-304

STUDIES ON THE INTERNAL GAS COMPOSITION IN THE GREEN STALK OF WINTER WHEAT (TRITICUM AESTIVUM L.)

P. Bornemisza, F. Sági*, B. Schlenk, L. Mózsik* and G. Langer

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Botanikai Közl. 70 (1983) 165-170

(In Hungarian)

INTERNAL GAS CONTENT OF WHEAT STALK AND ITS POSSIBLE RELATIONSHIP TO YIELD

F. Sági*, L. Mózsik*, B. Schlenk, P. Bornemisza and G. Langer

*Cereal Research Institute, Szeged

Talk, Meeting of Hungarian Biological Society, Veszprém, 27-29 June, 1984

CORRELATION BETWEEN THE CO_2 CONTENT OF WHEAT STALK AND THE AMOUNT OF CROP

F. Sági*, L. Mózsik*, M. Csatlós and P. Bornemisza

*Cereal Research Institute, Szeged

Talk, 1193rd Session of the Botanical Section of the Hungarian Biological Society, Budapest, 19 November, 1984

MUTATION BREEDING OF LUPIN: OPTIMAL DOSE RANGE DETERMINATION

P. Bornemisza, M. Csatlós, M. Ratkos* and F. Borbély*

*Research Centre of Seed Production, Nyiregyháza

Talk, 15th Annual Meeting of ESNA, Piacenza, 3-7 September, 1984

SUPERCONDUCTING QUANTUM INTERFEROMETER DEVICE (SQUID) AND ITS ANALYTICAL APPLICATIONS

S. Mészáros and K. Vad

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984. Finommechanika-Mikrotechnika 23 (1984) 165-167

(In Hungarian)

RESIDUAL RESISTIVITY OF GALLIUM SAMPLES WITH DIFFERENT IMPURITY CONTENTS

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ATOMKI Report C/1 (1984)

(In Russian)

DEPENDENCE OF THE RESIDUAL RESISTIVITY OF GALLIUM ON THE CONCENTRATION OF LEAD IMPURITY

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*Research Institute of Aluminium Industry, Budapest
**Factory of Aluminious Earth, Ajka

Submitted to Fizika metallov in metallovedeniye

(In Russian)

EARTH SCIENCES AND ENVIRONMENTAL RESEARCH

POSSIBILITY OF A THERMAL CATASTROPHE IN THE EARLIEST PERIOD OF THE EARTH AS REVEALED BY THE VOLATILE CONTENT OF IGNEOUS CRUSTAL AND MANTLE ROCKS

A. Szalay

Acta Phys.Hung. 55 (1984) 427-442

Experimental investigations of the total volatile (water and gases) content of a number of igneous crustal and mantle rock samples demonstrate that the crust is degassed in comparison with the volatile rich mantle. A hypothesis is postulated according to which the degassing of the surface of the Earth occurred by a short catastrophal external heating event which did not penetrate into the deeper mantle layers. The source of this high heat influx was assumedly the Sun, about $4\text{-}4.6 \cdot 10^9$ years ago.

METHODOLOGICAL ANALYSIS OF K/Ar DATING ON SEDIMENTARY GLAUCONITES FROM HUNGARY

M. Földvári* and K. Balogh

*Hungarian Geological Institute, Budapest

1982 Annual Report of Hungarian Geological Institute (Müszaki Kiadó, Budapest, 1984) pp. 479-489

Instrumental mineralogical studies (X-ray diffraction, IR spectroscopy, thermal analysis) and K/Ar dating were carried out on glauconite fractions from sedimentary rocks of different ages. It has been observed that only postdiagenetic glauconites, where the interlayered expansive layers disappear, are suitable for radiometric dating. The loss of radiogenic argon from these glauconites and the ratio of radiometric to geological ages are more or less constant.

(In Hungarian)

CHRONOLOGY OF MIOCENE VOLCANISM IN NORTH-EAST HUNGARY

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*Department of Mineralogy and Geology, Kossuth University, Debrecen

**Hungarian Geological Institute, Budapest

Proc. 12th Congr. of the Carpatho-Balkan Geological Association, Bucharest, September 8-13, 1981, An. Inst. Geol. Geofiz. (Bucharest) 61 (1983) 151-158

MIOCENE VOLCANITES COVERED BY SEDIMENTS AND ON THE SURFACE IN NE HUNGARY

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*Department of Mineralogy and Geology, Kossuth University, Debrecen

**Hungarian Geological Institute, Budapest

Proc. 12th Congr. of the Carpatho-Balkan Geological Association, Bucharest, September 8-13, 1981, An. Inst. Geol. Geofiz. (Bucharest) 61 (1983) 263-271

(In French)

CHRONOLOGY OF MIOCENE PYROCLASTICS AND LAVAS OF HUNGARY

E. Árva-Sós, K. Balogh, G. Hámor*, Á. Jámbor* and L. Ravasz-Baranyai*

*Hungarian Geological Institute, Budapest

Proc. 12th Congr. of the Carpatho-Balkan Geological Association, Bucharest, September 8-13, 1981, An. Inst. Geol. Geofiz. (Bucharest) 61 (1983) 353-358

CHRONOLOGY OF GRANITOID AND METAMORPHIC ROCKS OF TRANSDANUBIA (HUNGARY)

K. Balogh, E. Árva-Sós and G. Buda*

*Eötvös University, Budapest

Proc. 12th Congr. of the Carpatho-Balkan Geological Association, Bucharest, September 8-13, 1981, An. Inst. Geol. Geofiz. (Bucharest) 61 (1983) 359-364

PETROGRAPHY AND K/Ar DATING OF TERTIARY AND QUATERNARY BASALTIC ROCKS IN HUNGARY

K. Balogh, Á. Jámbor*, Z. Parténvi*, L. Ravasz-Baranyai*, G. Solti* and A. Nusszer**

*Hungarian Geological Institute, Budapest
**Hungarian Hydrocarbon Institute, Százhalombatta

Proc. 12th Congr. of the Carpatho-Balkan Geological Association, Bucharest, September 8-13, 1981, An. Inst. Geol. Geofiz. (Bucharest) 61 (1983) 365-373

K/Ar CHRONOLOGIC STUDY ON MIOCENE VOLCANIC ROCKS FROM THE TOKAJ MOUNTAINS AND TISZÁNTUL, HUNGARY

Z. Pécskay

Ph.D. thesis (supervisor: K. Balogh), ATOMKI, Debrecen, 1983. Submitted to Kossuth University, Debrecen

(In Hungarian)

^{14}C DATING

É. Csongor

Talk, 11th National Conf. of Secondary School Teachers of Chemistry, Debrecen, 23-25 August, 1984

RADIOCARBON DATING OF HOLOCENE BONE SAMPLES IN HUNGARY

É. Csongor, I. Bognár-Kutzián*, I. Szabó and E. Hertelendi

*Institute of Archeology of the Hung. Acad. of Sci., Budapest

Proc. 1st Int.Symp. on ^{14}C and Archeology, Groningen, August, 1981, ed. W.G. Mook and H.J. Waterbolk, PACT 8 (1983) 385-390

Measurements were carried out which related to two different ages of the prehistory of Hungary which had not been previously dated directly by radiocarbon. Bone samples were taken from graves which belong a) to the Middle Copper Age (Bodrogkeresztur culture) and b) to the Late Iron Age (early La Tène). The treatment of the bone samples is discussed. A quadrupole mass spectrometer was used to check the absence of nitrogen oxides after the purification of the carbon dioxide. Most of the measured conventional radiocarbon dates of the bone samples are in good agreement with the previously determined chronologies.

RADIOACTIVITY IN THE ENVIRONMENT

É. Csongor

Talk, Symp. in honour of A. Szalay on Nuclear Research and Its Application in Debrecen; Debrecen, 27 September, 1984. Submitted to Fiz. Szemle

(In Hungarian)

ATMOSPHERIC RADIOACTIVITY

É. Csongor

Talk, Proc. 27th Meeting of Secondary School Teachers of Physics, Veszprém, 5-7 April, 1984, ed. E. Tóth (Á. Tóth Grammar School, Debrecen) pp. 23-26

(In Hungarian)

PHYSICAL METHODS FOR THE RESEARCH AND PROTECTION OF THE HUMAN ENVIRONMENT

D. Berényi

Introductory talk, Session of the Hungarian Academy of Sciences on the Physical Methods for the Research and Protection of the Human Environment, Budapest, 30 May, 1984. Submitted to Novel Results of Atomic-Energy and Nuclear Research

(In Hungarian)

THE PROTON-INDUCED X-RAY EMISSION METHOD (PIXE) AS APPLIED TO THE INVESTIGATION OF ATMOSPHERIC AEROSOLS

Gy. Szabó, I. Kiss, E. Koltay, Á. Mészáros* and S. László

*Institute for Atmospheric Physics, Budapest

Talk, Session of the Hungarian Academy of Sciences on the Physical Methods for the Research and Protection of the Human Environment, Budapest, 30 May, 1984. Submitted to Novel Results of Atomic-Energy and Nuclear Research

(In Hungarian)

INVESTIGATION OF AIR POLLUTANTS EMITTED BY POWER PLANTS WITH THE ESCA METHOD

L. Kövér and J. Tóth

Talk, Session of the Hungarian Academy of Sciences on the Physical Methods for the Research and Protection of the Human Environment, Budapest, 30 May, 1984. Submitted to Novel Results of Atomic-Energy and Nuclear Research

(In Hungarian)

MEASUREMENT OF RADON AND ITS DECAY PRODUCTS IN DWELLINGS WITH TRACK DETECTORS

B. Paripás*, S. Takács*, G. Somogyi, I. Hunyadi and I. Nikl**

*Health and Anti-Epidemic Authority, Miskolc
**Joliot-Curie National Laboratory for Radiation Biology

Talk, Session of the Hungarian Academy of Sciences on the Physical Methods for the Research and Protection of the Human Environment, Budapest, 30 May, 1984. Submitted to Novel Results of Atomic-Energy and Nuclear Research

(In Hungarian)

ANTHROPOGENIC RADIOACTIVE POLLUTION OF THE ATMOSPHERE

É. Csongor and E. Hertelendi

Talk, Session of the Hungarian Academy of Sciences on the Physical Methods for the Research and Protection of the Human Environment, Budapest, 30 May, 1984. Submitted to Novel Results of Atomic-Energy and Nuclear Research

(In Hungarian)

MEASUREMENT OF ENVIRONMENTAL RADON AND ITS DECAY PRODUCTS WITH TRACK DETECTORS

G. Somogyi and I. Hunyadi

Talk, 16th Int.Symp. on Radiation Protection Physics, Dresden, 5-9 March, 1984

The radon and its decay products are present everywhere in the environment. As the alpha-radioactive nuclides are the main sources of the environmental radiation exposure of the population, the measurement of their activity concentration is of particular interest and importance.

Our report summarizes the main fields of the possible applications where LR-115 and the recently developed CR-39 plastic track detectors may be applied as passive radon dosimeters in the environment. Several methods and devices developed and used in our laboratory for studying the spatial and temporal variations of radon activity concentration under various circumstances (soil, water, air, industrial wastes) are presented. The etch-track method of radon emanation measurements was firstly tested in uranium exploration. Using the experience of field studies and performing further methodical improvements, we apply the etch-track technique in radon exhalation and/or exposure measurements in caves, dwellings, construction materials and wastes of coal combustion. We have made attempts to extend the track method to thoron measurements too. The main results achieved are summarized and illustrated.

STUDY OF ^{210}Po AND ^{210}Pb DISTRIBUTIONS IN ENVIRONMENTAL SAMPLES BY CR-39 TRACK DETECTOR

I. Hunyadi, G. Somogyi and S. Szilágyi

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S.A. Durrani et al., Nucl. Tracks 8 (1984) 491-495

ENVIRONMENTAL RADON MEASUREMENTS WITH TRACK METHODS

G. Somogyi

Seminar talk, Center of Nuclear Technique, Hochiminh City, 8 December, 1984

RADON MEASUREMENTS IN THE ENVIRONMENT WITH TRACK TECHNIQUE

G. Somogyi

Seminar talk, Jožef Stefan Institute, University of Ljubljana, September 7, 1984

ENVIRONMENTAL RADIOACTIVITY MEASUREMENTS WITH PLASTIC TRACK DETECTORS

G. Somogyi and I. Hunyadi

Seminar talk, Université de Clermont-II, Laboratoire de Physique Corpusculaire, May 30, 1984

ENVIRONMENTAL ALPHA RADIOACTIVITY MEASUREMENTS WITH PLASTIC TRACK DETECTORS

I. Hunyadi

Talk, Joint Session of the Working Party of Isotope Techniques of the Hung. Acad. of Sci. and the Section of Radiochemistry, Hung. Chemical Association, Debrecen, 25 April,1984

STUDY OF RADIOACTIVITY IN THE CAVES OF MOUNTAIN BÜKK

G. Somogyi and L. Lénárt*

*Department of Geology, Technical University of Heavy Industry, Miskolc

Talk, Inter-University Symp. on Karst Research and Spelaeology, Miskolc, 13-14 September, 1984. Submitted to NME Közlemények

(In Hungarian)

RESULTS OF THE USE OF ALPHA TRACK RADIOGRAPHY IN MINERALOGY AND GEOCHEMISTRY

J. Vincze* and G. Somogyi

*Mecsek Ore Enterprises

Talk, COMECON Symp. on Methods of the Analysis of Mineral Raw Materials, Brno, 8-12 October, 1984

URANIUM PROSPECTION USING TRACK TECHNIQUE

G. Somogyi

Seminar talk, Nuclear Research Institute, Dalat, 14 December, 1984; Vietnam National Atomic Energy Institute, Hanoi, 25 December, 1984

FROM URANIUM PROSPECTION TO THE ANALYSIS OF RADIOGENIC POLLUTANTS OF THE ENVIRONMENT

G. Somogyi

Talk, Seminars on Research of New Energy Resources, Debrecen, 13-14 February, 1984

XPS INVESTIGATION OF AIR POLLUTION EJECTED BY A COAL-FIRED POWER PLANT

L. Kövér and J. Tóth

Atmospheric Environment 18 (1984) 2135-2141

INTEGRAL MEASUREMENTS OF ALPHA AND GAMMA RADIATION IN DWELLINGS

B. Paripás*, G. Somogyi, I. Nikl**, S. Takács* and G. Rohács*

*Health and Anti-Epidemic Authority, Miskolc
**Joliot-Curie National Laboratory for Radiation Biology, Budapest

Izotóptechnika 27 (1984) 83-84

(In Hungarian)

INTEGRAL ALPHA AND GAMMA RADIATION MEASUREMENTS IN DWELLING HOUSES

B. Paripás*, S. Takács*, G. Somogyi, I. Nikl**

*Health and Anti-Epidemic Authority, Miskolc
**Joliot-Curie National Laboratory for Radiation Biology, Budapest

Talk, 3rd Int.Conf. on Indoor Air Quality and Climate, Stockholm, 20-24 August, 1984. Submitted to the Proceedings

METHOD OF THE MEASUREMENT OF THE CONCENTRATION OF ^{85}Kr IN THE ATMOSPHERE AND MEASUREMENTS IN HUNGARY

É. Csongor

Proc. COMECON Conf. on Radiation Safety at Nuclear Power Stations, Vilnius, 18-23 May, 1982 (Energoatomizdat, Moscow, 1983) Vol. 4, pp. 57-63

(In Russian)

ENVIRONMENTAL POLLUTION DUE TO ATMOSPHERIC NUCLEAR WEAPON TESTS

E. Hertelendi and É. Csongor

Talk, Symp. on Scientific Aspects of the Arms Race and Nuclear War, Budapest, 23 March, 1984. Fiz. Szemle 34 (1984) 339-344

(In Hungarian)

ENVIRONMENTAL EFFECTS OF THE UTILIZATION OF NUCLEAR ENERGY

É. Csongor and E. Hertelendi

Talk, Seminars on Research of New Energy Resources, Debrecen, 13-14 February, 1984

NUCLEAR TRACK METHOD FOR THE MEASUREMENT OF EFFECTIVE RADIUM CONTENT AND EMANATION COEFFICIENT OF FLY ASHES

I. Hunyadi and G. Somogyi

Talk, Abstracts of School on Radiation Safety, Balatonkenese, 11-13 April, 1984, p. 58

(In Hungarian)

DEVELOPMENT OF METHODS AND INSTRUMENTS

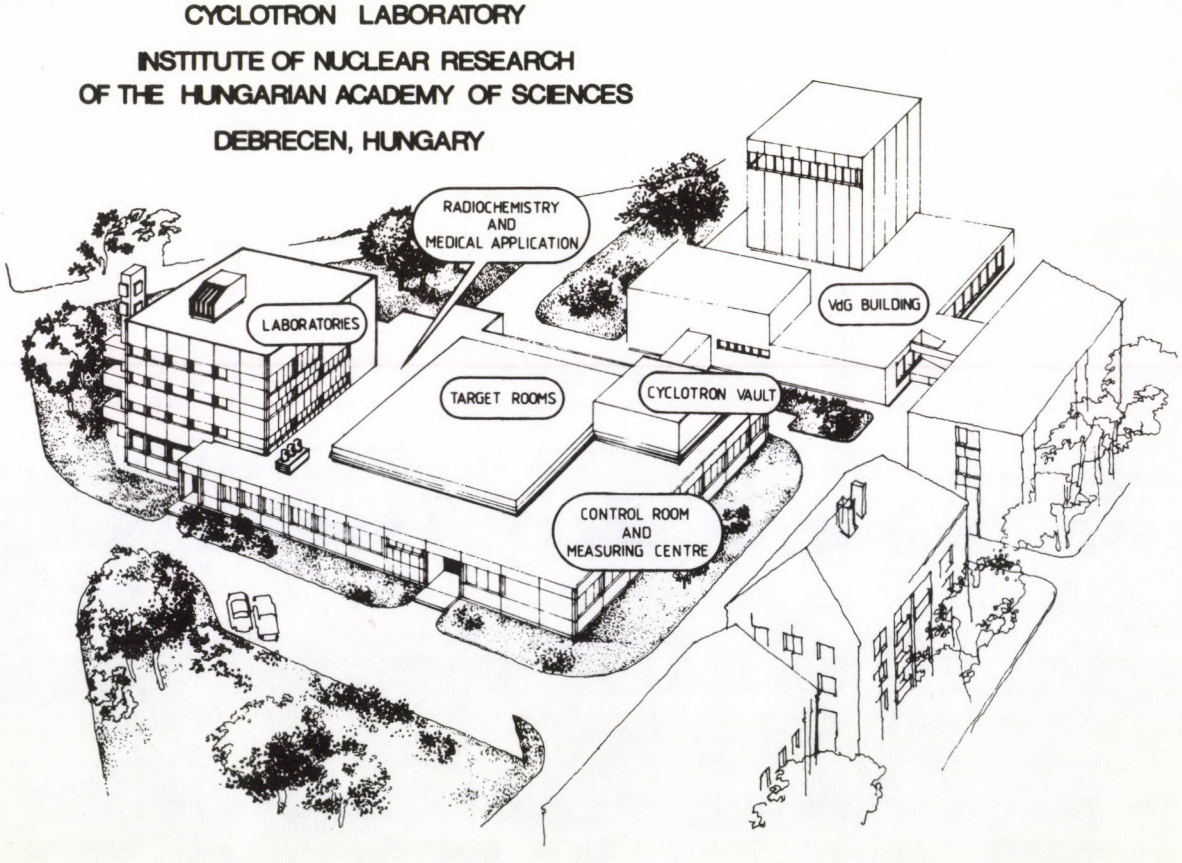
STATUS REPORT ON THE CYCLOTRON LABORATORY PROJECT

A. Valek and G. Bibok

The cyclotron program of the Institute is continuing according to the original schedule. The construction works in the shielded areas of the cyclotron and the beam transport system were completed in 1984. All the walls of the building were built up and finishing works are in progress.

The parts of the cyclotron and beam transport system manufactured by the D. Yefremov Scientific Research Institute of Electrophysical Apparature, Leningrad, were delivered by the end of September and their assembling was started. During the last days of the year the host computer of the laboratory, the KFKI (Budapest) made TPA 11440 was also delivered.

The figure below shows a view of the building. The cyclotron and the beam transport system are placed in an area of about 500 m^2 surrounded by shielding concrete walls. The areas of the levels of the entire building add up to about 5600 m^2. The present status of the assembling and constructing works indicates that the laboratory will be put into operation in the second half of 1985. The research projects are already in progress, and the actual experimental investigations will begin immediately on the "first beam" of the cyclotron.



PERFORMANCE AND DEVELOPMENT OF THE 5 MILLION VOLT VAN DE GRAAFF ACCELERATOR

L. Bartha, Á.Z. Kiss, E. Koltay, I. Papp and Gy. Szabó

The total beam time used in different activities amounted to 1706 hours in 1984, the distribution of the machine time between different experimental fields is shown in Table 1. The distribution of operating time versus ion species is presented in Table 2.

Table 1

Field	Hours	%
Nuclear physics	448	26.3
Atomic physics	613	35.9
Analytical studies	379	22.2
Other experiments	200	11.7
Machine tests	66	3.9

Table 2

Ion species	Hours	%
H^+	992	58.2
$^3He^+$	95	5.5
$^4He^+$	619	36.3

A new acceleration tube was installed at the beginning of the year. The configuration of the spiralling tube electrodes has been left unchanged. A decrease in the length of the drift gap between the acceleration tube and pre-analyser electrostatic quadrupole beam corrector resulted in better beam transport through the magnetic analyser: better beam stability and increased beam intensity were achieved. At the same time, the minimum terminal voltage with practical analysed beam intensity was found to be as low as 0.5 MV.

Our earlier investigations on the use of mapping the bremsstrahlung field around the generator as a diagnostic tool to check the working conditions of the acceleration tube [1] have been extended with measurements performed around the EGP-5 tandem accelerator in Zentralinstitut für Kernforschung, Rossendorf [2].

[1] Á.Z. Kiss, E. Koltay, Gy. Szabó and J. Félszerfalvi
Nucl. Instr. and Meth. 212 (1983) 81
[2] M. Friedrich, Á.Z. Kiss, E. Koltay and J. Félszerfalvi,
Nucl. Instr. and Meth., in press

CYCLOTRON LABORATORY IN THE INSTITUTE OF NUCLEAR RESEARCH, DEBRECEN

A. Valek, G. Bibok and A. Paál

Poster, Proc. Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) pp. 623-628

THE HUNGARIAN CYCLOTRON

A. Valek

Talk, 7th Meeting of Hungarian Nuclear Physicists, Pécs, 27-29 August, 1984

STATUS REPORT ON THE CYCLOTRON INVESTMENT

A. Valek

Talk, 8th Annual Joint Scientific Session of the Medical University (Debrecen) and ATOMKI; Debrecen, 3 December, 1984

CYCLOTRON PROGRAMME IN THE INSTITUTE OF NUCLEAR RESEARCH OF THE HUNGARIAN ACADEMY OF SCIENCES

A. Valek

Talk, National Meeting of Young Physicians, Debrecen, 20-21 September, 1984

CYCLOTRON LABORATORY IN THE INSTITUTE OF NUCLEAR RESEARCH OF THE HUNGARIAN ACADEMY OF SCIENCES, DEBRECEN

A.B. Gal'chuk*, L.E. Korolev*, A.V. Stepanov*, Z. Kormány and A. Valek

*Yefremov Institute, Leningrad

Talk, 9th National Conf. on Charged-Particle Accelerators, Dubna, 16-18 October, 1984

CYCLOTRON LABORATORY IN DEBRECEN

F. Tárkányi

Seminar talk, Institute of Physical and Chemical Research, Wako-shi, Saitama; Research Center of Ion Beam Technology, Hosei University, Tokyo; Institute for Chemical Research, Faculty of Engineering, Kyoto University, 22 November - 21 December, 1984

CALCULATION OF SOME CHARACTERISTICS OF THE BEAM DYNAMICS IN THE CENTRAL REGION OF THE CYCLOTRON U-400

Z. Kormány

JINR Report 9-84-129 (Dubna, 1984)

The ion motion in the central region of the four-meter isochronous cyclotron in the second harmonic acceleration mode is studied. We use measured data for the magnetic field of the cyclotron and calculated the three-dimensional electric field of the dees. The disadvantageous effect of the transverse electric field is shown. It has an influence upon the particles at the beginning of the second turn. The possibility of improving the beam quality by screening off this region from the electric

field was investigated. The modification leads to a better centering of the orbits and increases the vertical acceptance of the geometry approximately by a factor of 2.5.

(In Russian)

MAGNETIC FIELD OF ELECTROMAGNET FOR THE LOWERING, COMMUTATION AND MONOCHROMATIZATION OF THE U-400 CYCLOTRON ION BEAM

B.A. Klenin*, S.I. Kozlov*, Z. Kormány, V.N. Mel'nikov*, S.V. Stepantsov* and N.I. Tarantin*

*JINR, Dubna

JINR Report 9-84-357 (Dubna, 1984)

The results of measuring the structure of the magnetic field of a 90^{o} electromagnet with 1 m bending radius are presented. The magnet is used in an experimental arrangement at the U-400 cyclotron for lowering, commutation and monochromatization of the cyclotron beam. The fringing field is investigated in order to determine the location and shape of the effective field boundaries. The effective boundaries can be corrected by changing the position of the magnetic screens. The obtained field expansion coefficients of the quadrupole and sextupole terms with taking into account the extension of the fringing field of the real magnet allows one to define the result of a transformation of the ion beams more precisely, up to second order.

(In Russian)

BEAM TRANSPORT SYSTEM OF THE MGC CYCLOTRON: CONSIDERATIONS IN ITS DESIGN AND ION-OPTICAL CALCULATIONS

Z. Kormány and A. Valek

ATOMKI Report X/9 (1984)

(In Hungarian)

STATUS REPORT ON THE PREPARATIONS FOR MEDICAL APPLICATIONS IN THE CYCLOTRON LABORATORY OF ATOMKI

F. Szelecsényi

Talk, 8th Annual Joint Scientific Session of the Medical University (Debrecen) and ATOMKI; Debrecen, 3 December, 1984

COMPARATIVE STUDIES ON THE PRODUCTION OF ^{75}Br

S.M. Qaim*, Z. Kovács, G. Blessing* and G. Stöcklin*

*Kernforschungsanlage Jülich

Talk, 5th Int. Symp. on Radiopharmaceutical Chemistry, Tokyo, 9-13 July, 1984

Among the various radioisotopes of bromine, ^{75}Br is the most suitable isotope for positron emission computed tomography. It can be produced via several methods. From the viewpoint of yield and ^{76}Br-impurity level the $^{75}As(^{3}He,3n)^{75}Br$ and $^{76}Se(p,2n)^{75}Br$ reactions are more suited.

Over the last several years large scale production of ^{75}Br has been carried out in Jülich via the $^{75}As(^{3}He,3n)^{75}Br$ reaction using a high-current Cu_3As alloy as target material.

The $^{76}Se(p,2n)^{75}Br$ reaction was first suggested by the Groningen group. We investigated some targetry and chemical separation problems related to this process. Se-containing alloys like Cu_2Se and Al_2Se_3 were unsuitable as target materials. A 140 μm thick layer of 96.48 % enriched metallic ^{76}Se on Al-backing was therefore used. Irradiations were carried out using a rotating target system with 24 MeV protons at an incident angle of 19° (E_p=24→21 MeV). The loss of selenium for beam currents up to 20 μA was < 1%. For the chemical separation of radiobromine a dry distillation method using a quartz apparatus was developed (temp. 290 °C, Ar-carrier flow rate 100 ml/min, distillation time 30 min). The loss of selenium during distillation was 3 to 4%. The separated radiobromine was taken up in a small volume of hot water. The overall radiochemical yield of the process lies presently between 40 and 45%. The level of ^{76}Br-impurity at EOB amounts to about 3%.

Tests on the radiochemical and chemical quality control of the products obtained via both the (^{3}He,3n) and (p,2n) processes described above gave similar results. The radionuclidic impurity in the (p,2n)-process, however, is smaller. Together with the higher cross section this reaction seems to be preferable when at least 24 MeV protons are available.

A NEW TYPE OF ELECTRON SOURCES: METAL-INSULATOR-METAL SYSTEMS

S. Biri

Fiz. Szemle 33 (1983) 401-405

(In Hungarian)

CHARGE STATE DISTRIBUTION OF LIGHT HEAVY IONS ACCELERATED IN A SINGLE ENDED VAN DE GRAAFF ACCELERATOR

I. Hunyadi, Á.Z. Kiss, I. Kiss, E. Koltay and Gy. Szabó

Nucl. Instr. and Meth. 220 (1984) 154-157

NEUTRAL PARTICLES IN THE DIRECT BEAM OF A SINGLE ENDED VAN DE GRAAF ACCELERATOR

L. Bartha, Á.Z. Kiss, E. Koltay, I. Nyilas*, Gy. Szabó and L. Zolnai

*Bessenyei Teacher Training College, Nyiregyháza

Submitted to 4th Int.Conf. on Electrostatic Accelerator Technology and Associated Boosters, Buenos Aires, 15-19 April, 1985

BEAM-PULSING SYSTEM FOR β^- BACKGROUND REDUCTION

A. Krasznahorkay, T. Kibédi and J. Timár

ATOMKI Report E/4 (1984)

An external beam pulsing system has been built to reduce the β^- background in internal conversion electron measurements with a mini-orange spectrometer. The system is operating on a beam channel of the Debrecen 5MV Van de Graaff accelerator.

ADAPTATION OF A SUPERCONDUCTING-SOLENOID-TRANSPORTER Si(Li)-Si(Li) SPECTROMETER FOR IN-BEAM STUDIES OF INTERNAL-PAIR TRANSITIONS

A. Passoja*, P. Tikkanen*, A. Krasznahorkay, Z. Gácsi, T. Kibédi and T. Fényes

*Department of Physics, University of Jyväskylä

Nucl. Instr. and Meth. A223 (1984) 96-102

ADAPTATION OF A SUPERCONDUCTING-SOLENOID-TRANSPORTER Si(Li)-Si(Li) SPECTROMETER FOR IN-BEAM STUDIES OF INTERNAL-PAIR TRANSITIONS

A. Passoja*, P. Tikkanen*, A. Krasznahorkay, Z. Gácsi, T. Kibédi and T. Fényes

*Department of Physics, University of Jyväskylä

Abstracts of Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, ATOMKI Report A/2 (1984) 75

MINIORANGE ELECTRON SPECTROMETER FOR IN-BEAM MEASUREMENTS

J. Gulyás, A. Domonyi, T. Kibédi, A. Krasznahorkay, T. Fényes and Zs. Schram

Pribory I Tekhnika Eksperimenta 4 (1984) 53-56

(In Russian)

CONTROL UNIT OF THE APPARATUSES ELGA AND TOR FOR ON-LINE EXPERIMENTS WITH AN ISOTOPE SEPARATOR IN THE YASNAPP-2 PROJECT

Z. Árvay, V.I. Fominykh*, J. Gulyás and V.V. Kuznetsov*

*JINR, Dubna

Talk, Workshop on the YASNAPP-2 Project, Dubna, October 2-4, 1984. JINR Preprint 13-84-610 (Dubna, 1984)
(In Russian)

MEASURING APPARATUS ELGA FOR THE INVESTIGATION OF SHORT-LIVED NUCLEI

Z. Árvay, J. Gulyás, V.V. Kuznetsov*, V.I. Fominykh*, V.A. Utkin*, T. Kibédi and T. Fényes

*JINR, Dubna

Talk, Workshop on the YASNAPP-2 Project, Dubna, October 2-4, 1984.

DEVELOPMENT OF PROGRAMS FOR THE ANALYSIS OF GAMMA AND X-RAY SPECTRA

G. Székely and L. Zolnai

Talk, Seminars on the Application of Computational Research, Budapest, 14 March, 1984

COMPUTER PROGRAM FOR THE CONSTRUCTION OF THE LEVEL SCHEME ON THE BASIS OF ENERGY BALANCE OF GAMMA TRANSITIONS

F. Ditrói and I. Mahunka

Submitted to Nucl. Instr. and Meth.

A computerised method is presented for the construction of the level scheme of a nucleus on the basis of measured energies of the gamma transitions without any previous knowledge of the observed isotope. The method and the main steps of the algorythm are discussed. Calculated results are compared with the published schemes for some isotopes.

PRESENT STATUS OF NEUTRON DETECTION IN ATOMKI

L. Medveczky

Poster, Proc. 11th Regional Congr. of IRPA, Vienna, 20-24 September, 1983 (Austrian Association for Radiation Protection, Vienna, 1984) Vol. 2, pp. 25-29

DEVELOPMENT OF A METHOD OF ACCIDENTAL NEUTRON DOSIMETRY WITH SSNTD

G. Dajkó, G. Somogyi and L. Medveczky

Proc. COMECON Conf. on Radiation Safety at Nuclear Power Stations, Vilnius, 18-23 May, 1982 (Energoatomizdat, Moscow, 1983) Vol. 3, pp. 188-191

(In Russian)

PERSONNEL NEUTRON DOSIMETER CONSISTING OF FISSILE RADIATORS AND SSNTD

L. Medveczky and É. Zsolnay*

*Nuclear Reactor, Technical University of Budapest

Abstracts of School on Radiation Safety, Balatonkenese, 11-13 April, 1984, p. 67

(In Hungarian)

CHARACTERISTICS OF MIXED NEUTRON-GAMMA RADIATION FIELDS AROUND CYCLOTRONS

I. Uray, P. Manngård*, H.J. Probst** and M. Heinzelmann**

*Åbo Akademi, Turku
**Kernforschungsanlage Jülich

Poster, Proc. 11th Regional Congr. of IRPA, Vienna, 20-24 September, 1983 (Austrian Association for Radiation Protection, Vienna, 1984) Vol. 2, pp. 221-226

POSSIBLE USE OF LiF DOSEMETERS IN MIXED NEUTRON-GAMMA FIELDS

I. Uray, E. Gyarmati, J. Félszerfalvi*, H.J. Probst** and M. Heinzelmann**

*Department of Applied Physics, Kossuth University, Debrecen
**Kernforschungsanlage Jülich

Proc. 11th Regional Congr. of IRPA, Vienna, 20-24 September, 1983 (Austrian Association for Radiation Protection, Vienna, 1984) Vol. 1, pp. 132-137

RADIOACTIVE CONTAMINATION AT A CYCLOTRON

H.J. Probst* and I. Uray

*Kernforschungsanlage Jülich

Proc. 11th Regional Congr. of IRPA, Vienna, 20-24 September, 1983 (Austrian Association for Radiation Protection, Vienna, 1984) Vol. 2, pp. 199-205

(In German)

SENSITIVITY OF THE DEVICES FOR THE MEASUREMENT OF THE POSSIBLE CONTAMINATIONS OF THE JÜLICH ISOCHRONOUS CYCLOTRON. THE PROBLEM OF SETTING UP THE ALLOWED LEVEL OF CONTAMINATION

I. Uray and H.J. Probst*

*Kernforschungsanlage Jülich

Proc. 17th Annual Meeting of the German Radiation Protection Association on Radiation Protection Aspects of Radioactive Contamination, Aachen, 8-10 June, 1983, ed. H. Bonka and H.-G. Horn (Fachverband für Strahlenschutz Report FS-83-32-T) pp. 505-518

(In German)

BREMSSTRAHLUNG FIELD OF ELECTROSTATIC ACCELERATORS AND OPTIMIZATION OF RADIATION SHIELDS

J. Félszerfalvi*, Á.Z. Kiss, E. Koltay and Gy. Szabó

*Department of Applied Physics, Kossuth University, Debrecen

Health Physics Research Abstracts (IAEA) 11 (1984) 150

BREMSSTRAHLUNG MEASUREMENTS WITH COLLIMATED THERMOLUMINESCENT DOSE METERS AROUND A TANDEM ACCELERATOR

M. Friedrich*, R. Günzel*, Á.Z. Kiss, E. Koltay and J. Félszerfalvi**

*Central Institute of Nuclear Research, Rossendorf, Dresden
**Department of Applied Physics, Kossuth University, Debrecen

Submitted to Nucl. Instr. and Meth.

Simple collimated sets of thermoluminescent dose meters were used for measuring dose rate distribution curves in the bremsstrahlung field of an electrostatic accelerator. The increased axial resolution of the detector set resulted in curves clearly indicating local radiation maxima related to the electron optical properties of the acceleration tubes. Radiation data were compared to those from calculated secondary electron trajectories and to statistical data on resistor breakdowns in the voltage divider chain.

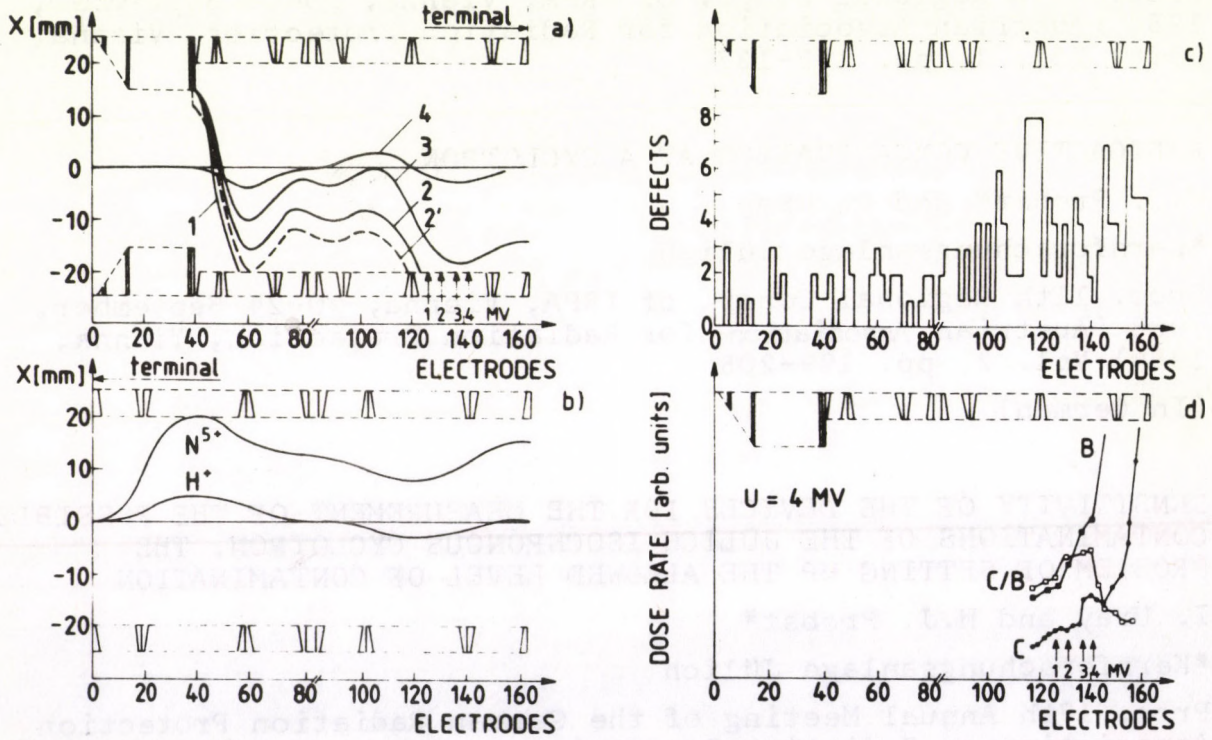


Figure caption

Electrode configuration, particle trajectories, distributions of defective tube resistors and dose rates for the acceleration tubes used in the present accelerator. (a) Curves 1,2, 2' and 3; trajectories of secondary electrons in the low energy tube. Arrows indicate the points of intersection of trajectory 3 with tube electrodes, for different generator voltages. (b) Ion trajectories in the high energy tube. (c) The distribution of defective tube resistors along the low energy tube. (d) Bremsstrahlung dose rates measured in uncollimated and collimated detector configurations indicated as B and C, respectively.

CONSTRUCTION OF A CHARGE-STATE SEPARATOR

L. Gulyás

Diploma thesis (supervisor: Á. Kövér), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen

AN ELECTRON SPECTROMETER (ESA-13) FOR ATOMIC RESEARCH

Á. Kövér, D. Varga, E. Szmola, J. Herbák, L. Kövér and I.Cserny

Poster, Proc. 5th Seminar on Electron Spectroscopy of Socialist Countries, Dresden, 26-29 August, 1984 (Dresden Technical University, 1984) p. 69

DATA ACQUISITION SYSTEMS FOR ELECTRON SPECTROMETERS

I. Cserny, T. Lakatos, J. Molnár, G. Pintér and S. Fekete

Poster, Proc. 5th Seminar on Electron Spectroscopy of Socialist Countries, Dresden, 26-29 August, 1984 (Dresden Technical University, 1984) pp. 29-30

DISTORTED FIELD CYLINDRICAL MIRROR ELECTRON SPECTROMETER I. CALCULATION OF THE ANALYZER

D. Varga, Á. Kövér, L. Kövér and L. Redler

Submitted to Nucl. Instr. and Meth. A

SOLID STATE NUCLEAR TRACK DETECTORS

G. Somogyi

Seminar talk, Center of Nuclear Technique, Hochiminh City, 8 December, 1984

TECHNIQUE AND APPLICATION OF SOLID STATE NUCLEAR TRACK DETECTORS

G. Somogyi

Talk, Joint Session of the Working Party of Isotope Techniques of the Hung. Acad. of Sci. and Hung.Chemical Association, Debrecen, 25 April, 1984

DEVELOPMENT OF NUCLEAR TRACK DETECTORS

G. Somogyi

Talk, Symp. in honour of A. Szalay on Nuclear Research and its Application in Debrecen; Debrecen, 27 September, 1984. Submitted to Fiz. Szemle

(In Hungarian)

THE SOLID-STATE NUCLEAR TRACK DETECTOR METHOD

G. Somogyi

Seminar talk, Vietnam National Atomic Energy Institute, Hanoi, 24 December, 1984

NUCLEAR TRACK PROCESSING AND EVALUATION

G. Somogyi

Seminar talk, Nuclear Research Institute, Dalat, 14 December, 1984

CHARGED PARTICLE SPECTROSCOPY WITH SOLID STATE NUCLEAR TRACK DETECTORS

I. Hunyadi and G. Somogyi

Talk, Proc. Int. Symp. on In-beam Nuclear Spectroscopy, Debrecen, May 14-18, 1984, ed. Zs. Dombrádi and T. Fényes (Akadémiai Kiadó, Budapest, 1984) Vol. 2, pp. 573-584

POSSIBILITY OF NEUTRON SPECTROSCOPY OF COSMIC RAYS BY USING A HIGH-SENSITIVITY, CR-39 TYPE, HUNGARIAN TRACK DETECTOR

G. Dajkó and G. Somogyi

Talk, 17th Conf. of the Permanent Working Party of Socialist Countries on Cosmic Biology and Medicine, Brno, 10-16 June, 1984

DEVELOPMENT OF HIGH-SENSITIVITY NUCLEAR TRACK DETECTOR FOR NEUTRON DOSIMETRY AND SPECTROMETRY

G. Somogyi

Talk, Abstracts of School on Radiation Safety, Balatonkenese, 11-13 April, 1984, p. 24

(In Hungarian)

CURRENT PROBLEMS IN CHEMICAL TRACK ETCHING

G. Somogyi

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 27-35

FORMATION OF ION-BEAM IMAGES IN GELATINE AND VARIOUS POLYMERS

G. Somogyi, I. Hunyadi, R. Ilić*, A. Loose* and Zs. Varga

*Jožef Stefan Institute, University of Ljubljana

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 61-65

DEVELOPMENT OF THE DYED-TRACK METHOD FOR KODAK CN-85 DETECTOR

G. Somogyi, M. Tóth-Szilágyi, Zs. Varga, M. Monnin* and M. Lferde*

*Université de Clermont-II, Laboratoire de Physique Corpusculaire

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 67-70

EFFECT OF PARTICLE FLUENCE ON TRACK DIAMETER AND RESPONSE OF ELECTROCHEMICALLY ETCHED SSNTD

K. Turek* and G. Dajkó

*Institute of Radiation Dosimetry, Prague

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 121-124

STUDY OF SPOT DEVELOPMENT AROUND TRACK- AND ELECTRIC-TREE-INDUCED PERFORATIONS THROUGH AN ALUMINIZED TRACK DETECTOR

G. Dajkó and G. Somogyi

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 125-128

A NEW POSSIBILITY FOR HIGH-RESOLUTION SPECTROSCOPY OF NUCLEAR PARTICLES ENTERING CR-39 AT SELECTED DIP ANGLES

G. Somogyi, I. Hunyadi, A.F. Hafez* and G. Espinosa**

*Alexandria University
**Instituto de Fisica, UNAM, Mexico

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 163-166

CALCULATION OF THERMAL EFFECTS OCCURING DURING THE MANUFACTURE OF CR-39 SHEETS

S. Szilágyi and G. Somogyi

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 171-174

DEVELOPMENT OF A CCD BASED SYSTEM CALLED DIGITRACK FOR AUTOMATIC TRACK COUNTING AND EVALUATION

J. Molnár, G. Somogyi, S. Szilágyi and K. Sepsy

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 243-246

MEASUREMENT OF RADON, RADON DAUGHTERS AND THORON CONCENTRATIONS BY MULTI-DETECTOR DEVICES

G. Somogyi, B. Paripás* and Zs. Varga

*Health and Anti-Epidemic Authority, Miskolc

Proc. 12th Int. Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 423-427

HOMOGENEITY AND FISSURE DETERMINATION IN URANIUM BARS WITH SOLID STATE NUCLEAR TRACK DETECTORS

F. Castillio*, I. Gamboa*, G. Espinosa*, G. Somogyi and A. Tapia*

*Instituto de Fisica, UNAM, Mexico

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 487-489

NEUTRON-INDUCED AUTORADIOGRAPHY BASED ON RELIEF AND DYED IMAGE FORMATION IN POLYMERS

A. Loose*, I. Hunyadi, G. Somogyi, Zs. Varga, M. Najžer* and R. Ilić*

*Jožef Stefan Institute, University of Ljubljana

Proc. 12th Int.Conf. on Solid State Nuclear Track Detectors, Acapulco, 4-10 September, 1983, ed. S. Durrani et al., Nucl. Tracks 8 (1984) 501-504

STUDY OF NEUTRON RADIOGRAPHIC CHARACTERISTICS OF MA-ND TYPE (ALLYL - DIGLYCOL - CARBONATE) NUCLEAR TRACK DETECTORS

R. Ilić*, J. Rant*, M. Humar*, G. Somogyi and I. Hunyadi

*Jožef Stefan Institute, University of Ljubljana

Talk, 14th Int.Symp. on Autoradiography, Reinhardsbrunn, 19-23 November, 1984

Recently in cooperation between MOM and ATOMKI in Hungary commercially available new nuclear track detector type MA-ND has been developed. Its use is hoped to be promising in neutron radiography using different alpha and proton emitting converter materials. In our present work the optical density, resolution properties and contrast sensitivity of this detector in combination with boron converters (B, BN, B_4C, $Li_2B_4O_7$ and boron glass) have been investigated and compared with that of other alpha sensitive plastics (Kodak CN-85 and CR-39 produced by Welcast Plastic Inc.). Concerning neutron imaging properties our preliminary experience indicates that the MA-ND sheet can be successfully used in neutron radiography and microneutronography. A few neutron radiographs of nuclear fuel taken with MA-ND sheets are presented.

INTRODUCTION AND GEOCHRONOLOGICAL APPLICATION OF THE K/Ar METHOD IN HUNGARY

K. Balogh

Thesis for the Candidate of Physical Sciences degree, ATOMKI, Debrecen, 1984. Submitted to the Hungarian Academy of Sciences

(In Hungarian)

VACUUM TECHNICAL DEVICES AND EQUIPMENTS

I. Berecz

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984. Finommechanika-Mikrotechnika 23 (1984) 168-172

(In Hungarian)

APPLICATION OF QUADRUPOLE MASS SPECTROMETERS

S. Bohátka

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984

DEVELOPMENT OF QUADRUPOLE MASS SPECTROMETERS

I. Berecz, S. Bohátka, G. Langer, Z. Diós and L. Kiss

Poster, Contributions to 8th Conf. on High Vacuum, Surfaces and Thin Layers, Dresden, 5-7 March, 1984, ed. W. Schwenke and L. Heunemann (Physical Society of GDR, 1984) Vol. 2, pp. 235-238

MULTICHANNEL ANALYSER SYSTEM WITH QUADRUPOLE MASS SPECTROMETER

S. Bohátka, I. Berecz, Z. Diós, G. Langer, L. Kiss and J. Szilágyi*

*BIOGAL Pharmaceutical Works, Debrecen

Talk, Contributions to 23rd Meeting of the Hungarian Biochemical Society, Pécs, 26-29 August, 1984, Acta Biochim. et Biophys. 19 (1984) 73

SYSTEM SOFTWARE FOR A QUADRUPOLE MASS SPECTROMETER CONTROLLED BY A MICROCOMPUTER WITH MULTI-CHANNEL SAMPLING

Gy. Asztalos, Z. Diós, K. Sepsy, I. Szabó and G. Székely

Poster and talk, Contributions to Conf. on Programming Systems, Szeged, 26-28 November, 1984 (J. von Neumann Computational Society, Szeged, 1984) pp. 59-60

(In Hungarian)

QUADRUPOLE MASS SPECTROMETRIC ANALYSER AND CONTROL SYSTEM FOR MONITORING INDUSTRIAL FERMENTATION PROCESSES

J. Szilágyi*, S. Bohátka, G. Langer, Gy. Sántha* and P.Daróczy*

*BIOGAL Pharmaceutical Works, Debrecen

Talk, Contributions to 23rd Meeting of the Hungarian Biochemical Society, Pécs, 26-29 August, 1984, Acta Biochim. et Biophys. 19 (1984) 75

DETERMINATION OF NON-VOLATILE COMPONENTS IN FERMENTATION BROTH BY MASS SPECTROMETER

Gy. Sántha*, J. Szilágyi*, K. Pólya*, S. Bohátka and G. Langer

*BIOGAL Pharmaceutical Works, Debrecen

Talk, Contributions to 23rd Meeting of the Hungarian Biochemical Society, Pécs, 26-29 August, 1984, Acta Biochim. et Biophys.19 (1984) 74

QUADRUPOLE MASS SPECTROMETRIC MEASUREMENT OF DISSOLVED AND FREE GASES

S. Bohátka

Talk, Symp. on Gas Enzymology, Odense, May 26-31, 1984. Submitted to the Proceedings, ed. H. Degn and R. Cox (Reidel, Dordrecht, 1985)

A quadrupole mass spectrometer (QMS) system was constructed for the measurement of fermentation gases. This work is based on the experience in constructing QMS, respiratory and blood-gas analysers. The analyser system shown here has a microcomputer controlled QMS for multicomponent analysis and a multi-channel sampling unit. The latter makes possible static and dynamic sampling of gases exhausted from the fermentor and gases dissolved in the fermentation broth. Examples are shown for its capabilities for on-line monitoring of long-term fermentation processes and off-line analysis of some components which were made volatile by adequate chemical treatment. The QMS equipment is a substantial part of a monitor system and the process control of a pilot plant of 1500 ℓ fermentors. It is capable of monitoring various fermentors quasi-simultaneously in industrial circumstances. Similar QMS technique was used for the in vivo measurement of free and dissolved gases of plants.

INDUSTRIAL APPLICATION OF MASS SPECTROMETRY TO MONITORING FERMENTATION

J. Szilágyi*, S. Bohátka, G. Langer, Gy. Sántha* and P. Seres*

*BIOGAL Pharmaceutical Works, Debrecen

Poster, Proc. 3rd European Congr. on Biotechnology, München, 10-14 September, 1984 (Verlag Chemie, Weinheim, 1984) Vol. 3, pp. 609-614

A measuring and control quadrupole mass spectrometer system (QMS) has been installed to monitor fermentation processes on industrial scale. This system enables us to carry out on-line monitoring of dissolved gases and volatile compounds such as O_2, CO_2, N_2, propanol being present in the fermentation broth and the same components in exit gases of the fermentors. In addition, the QMS system can make the exact determination of the compounds made volatile through some chemical reactions, too (i.e. NH_3, pyruvic acid, 2-ketoglutaric acid, phenilacetic acid, CO_3^{2-}). The present work is focussed on the measurement of CO_2 produced in the fermentation process, the dependence of CO_2 dissolved physically on the carbonate content and the pH of the broth.

MASS-SPECTROMETER-BASED MEASURING SYSTEM FOR MONITORING THE GAS METABOLISM OF FERMENTATION

G. Langer, S. Bohátka, J. Szilágyi*, I. Berecz, Z. Diós and L. Kiss

*BIOGAL Pharmaceutical Works, Debrecen

Talk, Contributions to 27th Hungarian Meeting on Spectroscopy, Szombathely, 4-7 June, 1984, ed. Z. Szilvássy (Scientific Association of Machine Industry, Veszprém, 1984) pp. 197-200

MASS SPECTROMETER MONITORING OF FERMENTATION

D. Lloyd*, S. Bohátka and J. Szilágyi**

*Department of Microbiology, University College, Cardiff
**BIOGAL Pharmaceutical Works, Debrecen

Submitted to Biosensors

SIMULTANEOUS DETERMINATION OF CLAY MINERALS, CARBONATES AND SULPHATES BY COMPLEX THERMOANALYTICAL METHODS

Gy. Szöőr*, É. Balázs* and S. Bohátka

*Department of Mineralogy and Geology, Kossuth University, Debrecen

Építőanyag 36 (1984) 274-277

(In Hungarian)

MASS SPECTROMETRIC DETERMINATION OF GASES IN PLANTS

G. Langer, S. Bohátka, I. Berecz, B. Schlenk, P. Bornemisza, K. Kiss, I. Buzás*, G. Pártay*, L. Mózsik** and F. Sági**

*Soil Science and Agricultural Chemistry Research Institute, Budapest
**Cereal Research Institute, Szeged

Vacuum 34 (1984) 757-758

In the research of plant physiology, measurements of gas metabolism play an important role. Most methods require that

plants should be examined whilst isolated from their natural environment. This paper presents a method using a quadrupole mass spectrometer with a membrane sampling probe to directly measure gases in plants, in gas-phase or dissolved in the liquids and tissues, without disturbing the metabolism and the environment of the plants. To demonstrate the capabilities of the method, the behaviour of the plants was investigated when they were exposed to extreme physical and chemical disturbances.

PROCEDURE AND DEVICE FOR RAPID AND DIRECT ANALYSIS OF THE EFFECT OF HERBICIDES AND OTHER BIOLOGICALLY ACTIVE CHEMICALS

I. Buzás*, G. Pártay*, B. Schlenk, P. Bornemisza, S. Bohátka and G. Langer

*Soil Science and Agricultural Chemistry Research Institute, Budapest

Poster, 14th Conf. on the Chemicalization of Agriculture, Keszthely, 20-24 June, 1984

CONTROL AND DATA ACQUISITION SYSTEM OF A MULTI-CHANNEL EMISSION SPECTROMETER

A. Paál, A. Vass, Zs. Kertész, L. Papp and Z. Kovács

Talk, Contributions to 27th Hungarian Meeting on Spectroscopy, Szombathely, 4-7 June, 1984, ed. Z. Szilvássy (Scientific Association of Machine Industry, Veszprém, 1984) pp. 233-234
(In Hungarian)

SQUID MEASURING TECHNIQUE

S. Mészáros and K. Vad

Seminar talk, Department of Low Temperature Physics, Eötvös University, Budapest, 21 November, 1984

COARSE BALANCING A SUPERCONDUCTING GRADIOMETER AT ROOM TEMPERATURE

K. Vad and S. Mészáros

Cryogenics 24 (1984) 460

An electronic arrangement is described which is used to check the balancing capabilities of superconducting gradiometers with the help of adjusting rings. This procedure can be used at room temperature before connecting the gradiometer to the SQUID.

MEASUREMENT OF NOISE IN TWO RF SQUID SYSTEMS

S. Mészáros, K. Vad, R. Tichý* and V. Petříček*

*Institute of Physics of the Czechoslovak Academy of Sciences, Prague

Czech. J. Phys. B 34 (1984) 712-719

Detailed experimental investigations of noise properties of SQUIDs developed in the Institute of Physics of the Czechoslovak Academy of Sciences and in the Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI) are described. The measurements include the determination of probability distribution functions (PDF's) and the power spectra of the total noise of SQUIDs. A noise analyser developed in ATOMKI is discussed together with the results obtained with it. It is concluded that these SQUIDs have a flat noise spectrum with Gaussian PDF (above $1/f$ noise). The absolute values of equivalent flux noise ($7{\cdot}7\times10^{-5}\ \Phi_0/\sqrt{(Hz)}$ for the Prague SQUID system biased at 38 MHz and $1{\cdot}8\times10^{-4}\ \Phi_0/\sqrt{(Hz)}$ for the Debrecen SQUID system biased at 10 MHz) are comparable to the best values reported in the literature of similar SQUID systems.

APPLICATION OF A SIMPLE DIRECTIONAL COUPLER FOR RF SQUIDs

S. Mészáros and K. Vad

Talk, 16th Int. Symp. on Low Temperature Physics and Cryoelectronics, Bad Blankenburg, 3-7 December, 1984

SQUID PICOVOLTMETER SYSTEM FOR RESIDUAL RESISTIVITY MEASUREMENTS

S. Mészáros, K. Vad and D. Novák

Talk, 16th Int. Symp. on Low Temperature Physics and Cryoelectronics, Bad Blankenburg, 3-7 December, 1984

APPLICATION OF SUPERCONDUCTING QUANTUM INTERFEROMETERS IN THE RESEARCH OF BIOMAGNETISM

K. Vad and S. Mészáros

Submitted to Kórház- és Orvostechnika

The authors summarize the capabilities of the applications of SQUID systems in the field of biomagnetism. First the principles of a SQUID system and the biomagnetic fields are outlined, and then the main applications, viz. the measurements of magnetic fields of the human lung, heart and brain are discussed.

(In Hungarian)

HARDWARE AND SOFTWARE DEVELOPMENTS IN THE X-RAY FLUORESCENCE LABORATORY OF ATOMKI

J. Pálvölgyi

Talk, Proc. Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 33-36

NOISE ANALYSIS OF FIELD EFFECT TRANSISTORS AND DEVELOPMENT OF AN AUTOMATIC DRIFTING APPARATUS FOR HIGH-RESOLUTION Si(Li) X-RAY SPECTROMETERS

J. Pálvölgyi

Ph.D.thesis (supervisor: J. Bacsó), ATOMKI, Debrecen, 1984. Submitted to Kossuth University, Debrecen

Si(Li) X-RAY SPECTROMETER WITH SIGNAL PROCESSING SYSTEM BASED ON FILTERING

T. Lakatos

Talk, Proc. Symp. on X-Ray Fluorescence Analysis and Interdisciplinary Applications, Debrecen, 13-15 November, 1984, ed. J. Bacsó, ATOMKI Report X/13 (1985) pp. 30-32

PROGRAMMABLE PEAK SELECTING DEVICE μPS 500

Z. Diós

Talk, Seminars on Vacuum Technics and Analysis, Budapest, 20 February, 1984. Finommechanika–Mikrotechnika 23 (1984) 264-269

CP/M SIMULATOR FOR PDP-11 AND OTHER COMPUTERS COMPATIBLE WITH IT

A. Vass

Poster and talk, Contributions to Conf. on Programming Systems, Szeged, 26-28 November, 1984 (J. von Neumann Computational Society, Szeged, 1984) pp. 32-34

HEBDOMADAL SEMINARS IN ATOMKI

12 January
Introduction and geochronological application of the K/Ar method in Hungary
K. Balogh

19 January
Study of the elastic scattering of 1,2,3 keV electrons on He, Ne, Ar atoms
J. Herbák
MEDICOR Works, Debrecen

26 January
K/Ar geochronologic study of Miocene volcanic rocks from the Tokaj mountains and Tiszántul, Hungary
Z. Pécskay

2 February
Study of inner shell ionization processes induced by charged-particle bombardment
B. Schlenk

9 February
Multiple ionization in high-energy heavy-ion—atom collisions
L. Végh

16 February
Visit to the Hanoi Institute of Physics
G. Kalinka

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